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From the Fair Labor Standards Act to Individual State Minimum Wages: Measuring State Minimum Wages and Economic Performance

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by

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Dedications

For my parents who never stopped believing in me and for being the most supportive people I know. Words and a dedication page aren't enough to describe the love and support that you have shown me throughout my high school and college years. Thank you for always having my back, for putting up with me, and for my education. Everyone says this, but honestly best parents anyone could ever ask for and I am extremely blessed for that.

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Thank You All

87 Broadway

List of Figures and Tables

Figures

Figure 1: EPI Average Hourly Wages by Education Level ____ *25*
Figure 2: EPI Hourly Wages by Percentile ____ *26*
Figure 3: Minimum Wage Impact on Employment and Wages ____ *30*
Figure 4: Monopsony Labor Market ____ *31*
Figure 5: Minimum Wage: CPI ____ *34*
Figure 6: Minimum Wage: CPI-U-RS ____ *35*
Figure 7: Minimum Wage: GDP Deflator ____ *36*
Figure 8: Real Federal Wage Using CPI, CPI-U-RS, and the GDP Deflator ____ *37*
Figure 9: Doucouliagos and Stanley: Funnel Graph Meta-Regression Analysis ____ *48*
Figure 10: State Minimum Wages Greater than the Federal ____ *56*
Figure 11: OLS Model (Real State Wage and GDP Growth) ____ *60*
Figure 12: Fixed vs. Random Effects ____ *61*
Figure 13: Haussman Test ____ *62*
Figure 14: Fixed Period, and Cross-Section Random Effects ____ *62*
Figure 15: Fixed Period, and Cross-Section Random Effects (Year on Year Growth) ____ *63*
Figure 16: Fixed Period, and Cross-Section Random Effects (Quarter to Quarter) ____ *64*
Figure 17: Fixed Period, and Cross-Section Random Effects (Year to Year) ____ *65*
Figure 18: Panel EGLS Cross-Section Random Effects (DV: Unemployment) ____ *66*
Figure 19: Autoregressive Distributed Lag (ARDL) ____ *68*
Figure 20: Hannan-Quinn Criterion ____ *69*
Figure 21: ARDL for Personal Disposable Income ____ *73*
Figure 22: ARDL for Personal Disposable Income with Employment ____ *74*
Figure 23: Employment Levels with the Minimum Wage ____ *75*
Figure 24: Employment Levels with the Minimum Wage and Disposable Income ____ *76*
Figure 25: Annual Median Wage and Median Employment ____ *78*
Figure 26: Dynamic OLS for Nominal Wages ____ *79*
Figure 27: Dynamic OLS for Nominal Wages and Employment ____ *80*
Figure 28: Dynamic OLS for Employment with Nominal Wages ____ *80*
Figure 29: Dynamic OLS for Employment with Nominal Wages and Disposable Income ____ *81*

Tables

Table 1: Federal Minimum Wage Increases ____ *21*
Table 2: Brown, Gilroy, and Kohen (1982) Forecasts on Minimum Wage Effects ____ *43*
Table 3: NELP Summary of Findings ____ *52*

Table of Contents

I. Introduction…….……1

II. History of the Minimum Wage……...……4

2.1 Before the Fair Labor Standards Act and its Passing……5

2.2 Post FLSA, Current Federal and State Wage Structure…….....14

2.3 Who are Minimum Wage Workers? 22

III. Minimum Wage and Employment: Literature Review…….…….28

3.1 Minimum Wage Economics……...…….29

3.2 Minimum Wage History of Thought…….……38

3.3 Myth and Measurement……..41

3.4 Case Studies…….……47

3.5 Meta-Analysis on Sub-State Minimum Wages…….50

3.6 Potential Outlook on an Increased Federal Wage……53

IV. Contribution……...55

4.1 Introduction…….……55

4.2 Explanation of Data…….58

4.3 Growth Equations……59

4.4 Growth, Unemployment and the Real Minimum Wage in the Short Run….64

4.5 Long Run Estimates: ARDL Models…….67

4.6 Disposable Income, Employment and the Minimum Wage…….……71

4.7 Alternative Estimation Method: Cointegration……78

V. Concluding Remarks…….83

VI. Bibliography and Appendix…….……85

I. Introduction

> *"Do not let any calamity-howling executive with an income of $1,000 a day, who has been turning his employees over to the Government relief rolls in order to preserve his company's undistributed reserves, tell you—using his stockholders' money to pay the postage for his personal opinions-/that a wage of $11 a week is going to have a disastrous effect on all American industry."*
>
> *Franklin D. Roosevelt*
> *Fireside Chat*
> *June 24th, 1938*

Throughout the political and economic spheres of policy, integrity, and fairness, the minimum wage has been a recent hot button issue that several policymakers are attempting to tackle in the United States. From President Roosevelt's tenure as the President of the United States to current representatives in federal and state legislatures, the correct and honest wage has been one of the chief assurances of income to individuals in the labor force. The wage floor provides security to employees that earn an honest guaranteed income from their employers. Along with a fair wage, the Fair Labor Standards Act that was pushed and signed by Roosevelt in 1938 also highlighted and outlined child labor laws, the 40-hour workweek, and overtime pay. Over its course, the federal minimum wage has been raised 22 times covering all employees in the United States. Some states in the latter half of the century have even incorporated their own minimum wages. As of 2017, more than half the States have wages higher than the federal wage of $7.25 per hour. Some cities and urban areas like San Francisco and the Seattle area have their own city wages that have been a major topic of discussion in city legislature, particularly on the east coast.

The federal minimum wage has not been raised since July of 2009, nearly eight ago years today. There are reasons as to why the federal wage has not been raised since that time which happened to be the tail end of the recession as some literature suggests that raising wages results in lower employment levels. The latter year after the recession raising the minimum wage on the federal level would not be the risk policymakers would be willing to take in a time where unemployment was at a staggering high. In recent news, organized labor and anti-poverty groups have been calling for local wages to be raised to $15 per hour. Different demographics support either raising the wage or not. Democrats and liberals tend to favor wage increases especially in local areas while conservatives tend to throw the idea off to the side. Enactments of state and local wage laws have started gaining ground leaving states that only have the federal wage legislation in the dust. Most of these states that remain at a standstill tend to be more conservative and from the south where factors such as the cost of living in these states remain relatively small. The local and state wage laws that are higher tend to have higher costs of living and are where economic activity is relatively high which will be addressed in the latter part of this project.

This project will go through the prior setting to the Fair Labor Standards Act all the way up to the current federal wage and state wage overview. The project will dive into classic minimum wage literature studies focusing on the microeconomic aspect of the minimum wage while the contribution piece will be more of a macroeconomic approach using real state wages. The reason behind my choosing this topic comes from a family background surrounding this field of study. Working at a job where you make the minimum wage but feeling like you deserve more is a stressful experience. Along the way, you begin to acquire skills that some educations or an entry level job do not teach you. The longer you work at

a minimum wage job and share life experiences with the people around that you are doing the same thing day after day, you begin to realize that most the people working these jobs should be able to earn a higher wage because they deserve to. Many of the minimum wage jobs are intended for youths so that they can acquire skills like teamwork, leadership, basic accounting, time management, and learning how to commit to a job. For some people, from a firsthand experience, this job is their essential means of income working 40 hours a week. This entire process has helped me deepen my understanding of the subject, and I am grateful for choosing my topic of discussion.

II. History of the Minimum Wage

This chapter will offer a historical synopsis from the origins of implementing a minimum wage on a national level to the current overall general federal minimum wage laws for the United States incorporating traditional historical styled footnotes. In this chapter, Section 2.1 addresses the process leading up to and the passing of the Fair Labor Standards Act in 1938. This section is implemented to amplify the national importance of minimum wage laws and the struggles that occurred within the United States political framework when passing the Fair Labor Standards Act. Section 2.2 addresses how the Fair Labor Standards Act was implemented after its passing. This chapter also depicts what specific types of employees and employers the act applies too as well as significant amendments made throughout its history. And Section 2.3 analyzes 2016 numbers from the Bureau of Labor Statistics annual reports and the data library provided from the Economic Policy Institute as a breakdown of categories of workers who receive federal and state minimum wages.

2.1 Before the Fair Labor Standards Act and its Passing

To this day, one of the most important pieces of United States legislature brought forth has been the adoption of the minimum wage during a time of significant economic downturn that the United States has ever experienced. The Great Depression that the United States experienced brought about a strong set of new ideas and policies that have shaped the country virtually from the depths that once was. This new shift in core economic ideology brought out some of the most efficient strategies that have distributed throughout the population. New ideas that provided through President Roosevelt and his administration provided healing and prosperity during a time of need. This needed change came through the Presidents three proponents of moving forward; relief, recovery and reform during the New Deal. One of the major components of the President's plan was to incorporate a way in which employees would legally maintain a set of legal standards through their employers. This notion is better known as the Fair Labor Standards Act or more simply put, FLSA. President Roosevelt quoted by saying, "I do think next to the Social Security Act it is the most important act that has been passed in the last two to three years."[1] The bills major themes included adding a national minimum wage offered to all employees, provided a maximum number of hours that a worker can work per week, and enforced child labor laws. However, this was not the first act that sought out to change the way employers behaved to their employees. Before the bill's signing in 1938, there was a considerable amount of buildup that leads to the passing of one of the most important measures in the history of the United States.

[1] Public Papers & Addresses of Franklin D. Roosevelt, 1938 (New York, NY, Macmillan Co., 1941), p. 404.

Origins of Labor Movement

Before diving into the brunt of the FLSA, the United States has had precursors of dealing with employment and labor issues before the ailments of the Great Depression. In 2000, Howard D. Samuel gave an outline that precedes the history of labor dating before President Roosevelt's New Deal in the monthly labor review. Dating back to the end of the Civil War, in 1868, Congress passed a law that attempted to enforce 8-hour work days for federal government employees. This process was then tried by some states to be adopted and, to limit the hours of the work day, however, these laws were poorly enforced on both state and federal levels.[2] Soon after the attempted 1868 laws, the American Federation of Labor established in 1886 which remained one of the largest unions before the mid 20th century. The union tried to advocate for shorter work week hours as well as the overall treatment of workers which brought employment reform to light. The ideas that the American Federation of Labor brought forth was more comforting and inviting at the time to the left side of politics rather than the right as conservatives pushed for bigger business and manufacturing incentives which would ignore these wage laws in place. These ideas eventually led to more state-focused employment and labor reform.

First Wage Laws

All this attention surrounding better treatment for workers ultimately evolved into state laws that were the prime focal point for women, and not men. In 1912, Massachusetts passed their first state minimum wage law for women and then by 1923, sixteen other states

[2] Samuel, Howard D. "Troubled Passage: The Labor Movement and the Fair Labor Standards Act." Monthly Labor Review. US Bureau of Labor Statistics, Dec. 2000

decided to do the same thing. [3] However, there was a hiccup in the process in 1923 where the minimum wage laws that passed had violated the constitution through the liberty of contract. Hereafter, anything else passed was considered advisory and that heavily favored employers and not employees. This standard was the norm up until the 1930's. Child labor laws throughout this process tended to play a backseat role because, by 1916, almost every state had implemented various child labor laws. Because this issue was handled at a state level, Congress didn't feel the need to control child labor laws on a federal level up until the Fair Labor Standards Act passed nearly two decades later.

What the question of the number of hours' employees should work per week was thus brought to the table, yet again by William Green who succeeded the founder of the American Federation of Labor, after Samuel Gompers passing. The misguidance of Green's proposal of shorter hours per week aimed towards the factory system instead of genuine reform in legislation. William Green's peers saw him as ineffective in preceding policies for the regular wage worker. Even though his ideas of a shorter work week and higher wages seemed to attract the eye, it repulsed big industrialized companies. Therefore, only leading to real reform when needed by President Roosevelt's New Deal program.

Making a Push

One of the biggest issues that surrounded the fall out of 1929 was the extreme unemployment level in the United States. From the get-go, the main prerogative that came across President Roosevelt's desk was the question of how to reduce such immense unemployment. President Roosevelt appointed Frances Perkins in 1933 as secretary of

[3] Thies, Clifford F. "The First Minimum Wage Laws." *CATO Journal* (1991): n. pag.716 CATO Institute, 1 Jan. 1991. Web. 28 Oct. 2016.

labor who ended up playing a significant role in the construction of the FLSA during the late mid to late 1930's. Being the former governor of New York, Roosevelt enforced employers to do bookkeeping, which meant that employers had to record the number of hours worked by their employees as well as the wages these companies handed out. Roosevelt took this idea and attempted to establish it in the United States, however, the National Recovery Administration had trouble mandating optimal maximum hours and real wages. The historical trend of wage labor and labor laws up to this point in time, outlined by Samuel, gives a summary leading up to policies that influenced the United States, but then a setback as seen prior brings fair labor reforms back down to its beginning stages. President Roosevelt needed to change this policy almost immediately.

Getting the Ball Rolling

Recording data and efficiently dealing with minimum wage and unemployment wasn't the only obstacle that Roosevelt and his administration had to hurdle during this time. The supreme court also played a significant role as to why labor laws weren't enforced according to Jonathan Grossman account in his in-depth overview of the historical analysis of the FLSA. Before understanding the support system of the FLSA, it is important to note that the supreme court during this time played a critical role as to how the United States approached honest labor. In 1933, President Roosevelt passed the National Industrial Recovery Act, or the NRA, which broadly states that it would suspend the anti-trust laws for industries to have fair trade codes leading to less competition and the ability to pay employees higher wages. [4] The NRA resulted in Roosevelt's Reemployment Agreement

[4] Roosevelt, *Public Papers*, II (June 16, 1933), p.246.

which attempted to raise wages, and to generate employment to restore businesses. Firms that signed the employment agreement offered its workers a 35 to 40-hour work week, $12 to $15 earnings per week and children that were under the age of 16 were not allowed to be employed. [5] The first of these codes was the Cotton Textile Code where the minimum wage was $13 in the north and $12 in the south as well as abolishing child labor which made President Roosevelt euphoric as stated in his Public Papers in July of 1933. [6]

Supreme Court Rulings

However, the battle between labor laws and the supreme court ensued when the court tested the new legislation constitutional strength during 1935. The case of Schechter Corp. vs. The United States claimed that Schechter Corp. chickens were being slaughtered immorally along with the sale of contaminated poultry and Schechter Corp. had to establish a new code that was attempting to fix the problem. Because of this, the supreme court deemed the NRA unconstitutional as it violated private interests based off of this case. [7] Along with this case, the Joseph Tipaldo case of 1936 also outlined the NRA as being unconstitutional. Tipaldo owned a laundromat and was forced to pay his female employees the New York State minimum wage of $14 per week and then had his employers pay Tipaldo back the difference of his previous $10 per week wage he initially gave out. Tipaldo was jailed but had his lawyers fight the case, taking it all the way to the Supreme Court whereby majority voting, the New York state law was deemed a violation of liberty

[5] Roosevelt, *Public Papers*, II (July 24 and 27, 1933), pp. 301, 308-12.
[6] Roosevelt, *Public Papers*, II (July 9 and 24, 1933), pp. 275, 99; Frances Perkins, *The Roosevelt I Knew* (New York, Viking Press, 1946); pp. 204-08.
[7] *Schechter Corp. v. United States*, 295 U.S. 495(1935).

of contract. [8] The ruling was considered as one of the most unpopular supreme court decisions ever ruled out. At this point, President Roosevelt was disgusted as the decision of the supreme court magnified the setback of not only women and child labor laws but his attempt at labor provisions.

After President Roosevelt's reelection in 1936, he pushed even harder for the restructure of child labor regulations, minimum wages, and maximum hours worked per week. Meanwhile, Roosevelt also threatened to add another supreme court justice over his distastefulness of the rulings. He said at his second inauguration, "A three-horse team pulls as one, the field will be plowed, but that the field will not be ploughed if one horse lies down in the traces or plunges off in another direction," [9] in regards to all three branches of government. The tide began to change for Roosevelt on March 29th, 1937 during the West Coast Hotel Company v. Parrish case in Washington historically known as 'The Big Switch.' This case marks a historical switch that Supreme Court Justice Owen Roberts made when he voted with the liberal minority in the Supreme Court's ruling to maintain the current Washington minimum wage law. [10] This was a major turning point in the judicial branch of the United States because Roosevelt didn't add a supreme court justice after his reelection because of this event. Justice Roberts denied that he voted with the minority to cease the threat played by Roosevelt saying that there were legal distinctions between this case and the Tipaldo case. The stranglehold set by the judicial branch, even

[8] Morehead v. Tipaldo, 298 U.S. 587 (1936).
[9] Roosevelt, Public Papers, VI (Feb. 5, 1937), pp. 51-59; VI (Mar. 4, 1937), p. 116; George Martin, Madam Secretary Frances Perkins(Boston Mass., Houghton-Mifflin Co., 1976), pp. 388-90.
[10] Chambers, "Big Switch," pp. 44, 73; Robert P. Ingalls, "New York and the Minimum-Wage Movement, 1933-1937," *Labor History*,Vol. XV, Spring 1974, pp. 191-97.

after one instance involving a state, seemed to fade after this ruling reopening talks for pro-labor legislation that could be passed by the supreme court.

First Round of Congress

This momentum that was set up led to the original construction of the FLSA, and guiding this ship along with Roosevelt was Secretary Frances Perkins who was promoted to Secretary of Labor in 1933. Since then, the two worked side by side to develop a bill for fair labor standards on the federal level. Secretary Perkins developed an original bill preempting the FLSA that only affected wages and hours worked with guided legal consultants. The bill was worked on by two of Roosevelt's legal counsel, Thomas Corcoran, and Benjamin Cohen, for about four years who added more depth to the original. President Roosevelt added the provision of child labor to ban the sale of goods produced by people under the age of 16 in hopes to sway Congress who had been noted as being pro-child labor laws. In May of 1937, Roosevelt sent the bill to Congress which entailed a minimum wage of ¢40 per hour, a maximum 40-hour work week, and a minimum age of 16 depending on certain industries. The bill also offered a five men labor standards board that would adjust wages and hours depending on individual cases. The justification of this bill was to shorten hours which would lead to the employment of low-skilled unemployed workers, and for minimum wages to support the new wage structure of the economy as well as to enable better working conditions throughout the country. [11] Opponents of the bill argued that it would hinder American businesses because of federal oversight while others say that the bill, overall, was poorly written. The population that supported the bill were mainly union

[11] *Record of the Discussion before the U.S. Congress on the FLSA of 1938*, I.(U.S. Department of Labor, Bureau of Labor Statistics)(Washington, GAO, 1938), pp.20-21.

organizations that only feared that the minimum wage would one day become the maximum wage. The bill was passed through the Senate by majority vote but was tangled up in the House of Representatives by the House Rules Committee that was made up of Republicans and conservative Democrats. Thus, the bill was a standstill at the house level.[12]

Second Round of Congress

During the second round in Congress of the FLSA, Roosevelt became frustrated and pushed child labor policies and wages harder than ever before in an attempt to take charge of the situation. Unable to sway the House Rules Committee to free up the bill, Congresswomen Mary Norton advocated changing the aspect of the bill that many members in the House disagreed on which was the five men labor board committee which many people thought held too much power. [13] The change that Norton proposed was to have an administer control wages and hours through the Department of Labor instead of a committee. Gaining the signatures that Norton needed from the petition for the Bills new amendment, the new bill could be again voted on by the house. However, the bill was not passed by the house because of the outcry of the AFL fighting for a still ¢40 wage and 40 hours per week.[14] Soon after this political debacle, the lawyers for the Department of Labor began working on a new bill. The problem that Roosevelt showed through the old bill was that it was too long and dense, so he encouraged his advisors to make the new bill shrink

[12] Perkins, *Roosevelt*,pp. 257-59; Paul Douglas and Joseph Hackman, "Fair Labor Standards Act, I," "*Political Science Quarterly* Vol. LIII, December 1938, pp. 500-03, 508; *The New York Times,* Aug. 18, 1937.
[13] *Record of Discussion of FLSA of 1938,* (U.S. Department of Labor), (1937), p. 415.
[14] *The New York Times, Dec. 13, 1937;* Douglas and Hackman, "FLSA," pp.508-11.

to two pages. The original bill that was 40 pages was then cut down to 10, and in January of 1938, Roosevelt approved it and then sent it to Congress for voting. The significant changes in this new bill rode the administrator of the previous and replaced it with the original five-person wage board which was less powerful. This, in turn, was denied yet again.

Signing of FLSA

Pleading to Congress, Roosevelt insisted that the new bill will not only affect the American Economy but the lives of the millions of people that were unemployed. The major congressmen against the bill came from the south who argued that southern businesses would not be able to compete with industries in the north because employers in the south would not be able to pay their workers ¢40 per hour and would have to lay off a majority of their employees. This outcry lowered the bills wage per hour proposal from ¢40 to ¢25 per hour.[15] Amendments proposed by the House and Senate overall weakened the bill targeting overall coverage. On May 24th, 1938, the Fair Labor Standards Act was voted on and passed with some alterations, to reduce the bill, made by the House and Senate and on June 25th, 1938 the bill was signed by President Roosevelt effective October 24th, 1938.[16]

[15] "Interview with Clara Beyer, No. 25, 1965; *U.S. Record of Discussion of FLSA of 1938.* V (U.S. Department of Labor), pp. 873, 915, 929.
[16] Roosevelt, *Public Papers,* VI (May 24, 1937), pp. 214-16.

2.2 Post FLSA, Current Federal and State Wage Structure

Going back to Samuels work, the Fair Labor Standards Act after the 1940's was in full effect. In 1941, the US Department of Labor reported that wage orders throughout the country were raised to nearly a million workers and by 1943, the Department of Labor stated that all employees would be paid the promised the ¢40 wage. After the passing of the FLSA, the federal minimum wage has been raised 22 times by the United States to account for different aspects of the economy such as the overall growth of the country, the standard of living, and countless other factors throughout history.[17] The historical framework of the act has also been expanded to cover more employees as well as to increase the wage rate. Throughout history, the act has been enforced by the Wage-Hour Board through the Department of Labor to offer protection for workers. Because of the standard working week hours of 40 in the FLSA, this encourages employers to hire more workers instead of paying time and a half for employees working more than 40 hours per week for overtime wages thus reducing unemployment.

FLSA Application, Employers and Employees

The act, in short, generally applies to employers and employees who are engaged in interstate commerce that earns annual sales greater than $500,000 according to the original law passed in 1938. Employees can still receive coverage even though the businesses that they work for earn less than $500,000 in sales if the company is engaged in interstate commerce according to the Department of Labor. Mainly, the businesses and employees that this applies to are hospitals, schools, institutions of higher education, and also federal,

[17] "Wage and Hour Division (WHD)." *Minimum Wage - Wage and Hour Division (WHD) - U.S. Department of Labor*. United States Department of Labor, n.d. Web. 28 Nov. 2016.

state, and local governments. The act does not cover elected state or local government officials holding office, their employees and volunteers, and also immediate family members of an employer in agriculture. The only way state wage laws can be in used over the FLSA is if the state's minimum wage, overtime policies, and child labor laws are more protective than the federal law according to the 29th US Code. Because of this, there are currently various state minimum wage laws that trump the federal law.

Wages, Tipped, Under 20

Throughout the course of the establishment of the FLSA, the federal minimum wage has increased 22 times, and the most recent increase has been set to $7.25 in 2009. As of 2015, a total of 29 states including the District of Columbia that have higher wages than the established federal according to Ben Zipperer's (2016) Historical State and Sub-State Minimum Wage Data. And according to the Bureau of Labor Statistics in 2011, over 90% of employees were paid an hourly wage greater than the federal $7.25. Tipped employees must be paid lower than the minimum wage. However, their wage earnings plus tips must be equal to at least $7.25 federally or the state minimum. A tipped worker is classified as a person who earns greater than $30 a month in tips according to Section 3 of the FLSA. If a tipped worker receives an incomplete amount of tips, then the employer has to compensate for the employee by increasing the employee's cash wage to be equal to $7.25 which was added to the FLSA in 1966 to US Code 29.

Disabilities

The FLSA also covers workers with specific disabilities that earn special minimum wages or SMW's. This section provides individuals the ability to work given their disabilities. Examples of these disabilities include mental illness or physical disabilities under section 14 of the FLSA. Employers offering SMW's must require a certificate from the Wage and Hour Board to employ and pay persons with disabilities. The four types of organizations that gain this certification are work centers, hospitals, businesses, and school work exploration programs. Work centers offer persons with disabilities employment, training, and rehabilitation services. Hospitals employ patient workers who work at the hospital while undergoing medical treatment. Businesses, in particular, need the certificate from the Wage and Hour Division to offer SMW's. School work exploration programs give students with disabilities the opportunity to work within their communities. When employers pay SMW's, they often are required to pay persons with disabilities a lower wage than another worker. This is because people without disabilities tend to be more productive with their work than people with disabilities. Therefore, the employee's wage is based on the worker's productivity. Employers must observe a disabled person's productivity to adjust their wages every six months according to Code of Federal Regulations 29 part 525.

Under 20, Full-Time Students, and High School Students

The youth opportunity wage applies to persons under the age of twenty to provide employment opportunities to underprivileged teens to work. Employers must pay people under twenty $4.25 an hour for 90 days or up until they turn twenty. After the employee

has done this, then the employer must pay the employee the minimum wage. Subminimum wage is also applicable to full-time students that are employed by a college or university, agriculture industry, and retail stores in which students earn 85% of the minimum wage. The goal associated with this is that it too, along with the youth opportunity wage, encourages employment opportunities for students with no restrictions on age under section 14 of the FLSA. Full-time students, student learners, or high school students above the age of 16, earn 75% of the minimum wage. Employers must receive a certificate from the Department of Labor to employ and pay students in this category under section 14 of the FLSA as well.

Overall Child Labor

The overall standing for child labor provisions set up by the FLSA and the Secretary of Labor is mainly divided up into agricultural or nonagricultural occupations. For youths employed outside of school hours, in nonagricultural services, the minimum age is set to be 16 while in agricultural services the minimum wage of work can, in fact, be 14 according to the US Department of Labor and the Wage Hour Division. There are many exemptions in regards to child labor that can be enforced as well, for example, the Parental Exemption. The Parental Exemption states that any child, regardless of age, can be employed in a business if that business is owned by either of the child's parents or guardian. However, if that business involves mining or manufacturing, then the child cannot be employed even if said company is owned and operated by a parent until the age of 18. This is determined by the Secretary of Labor because this type of work can be hazardous to minors according to

the Child Labor Provisions in Nonagricultural Occupations Under the Fair Labor Standards Act.

This increases both the minimum agricultural age up to 16 and the nonagricultural age to 18. The only way a youth can partake in hazardous agricultural occupations before the age of 16 is if they are classified as student learners or a student that is enrolled in a vocational program in agriculture that acknowledges the fact that the work being performed by the student is related to the training. Which essentially means that the student can operate machinery. This does not apply to youths employed on farms owned by a parent. Youths defined here, are covered by the FLSA and must receive the state or federal wage, but are exempt from overtime pay in the agricultural industry by US Code 29.

FLSA Major Amendments Since 1938

Since its enactment in 1938, the FLSA has been the skeleton that has supported and improved the lives of minimum wage workers throughout history. Just like any important document that has been issued by the government in the past, it wasn't perfect, and significant amendments to the FLSA were drawn out and applied to increase and expand the overall coverage of the FLSA. The first significant amendment to the act was the 1947 Portal-to-Portal Act. After ensuing court cases between employees and employers, this law drew a line to determine that activities performed before or after the actual work day were not to be included in real hours worked unless if the employer and employee came to an agreement involving specific employment terms. The act also allowed employees and employers to settle minimum wage and overtime claims if there was a dispute regarding amounts payable and the two parties cannot agree on a wage less than the minimum or less

than the required amount of overtime pay in sections 252 and 253 of US Code 29. The Fair Labor Standards Amendments of 1961 stated that workers that were employed in retail stores that earned annual sales of over $1 million were required to be paid minimum wage and overtime rates. And in Fair Labor Standards Amendments of 1966, this expanded to employees in construction, repair, laundering, and cleaning industries whose annual earnings were greater than $250,000. This era of expansion of the FLSA also included employees of hospitals, elementary and secondary schools, as well as institutions of higher learning. 1966 also added the extension of the provisions of tip credit allowing employers to include a portion of their employee's tips as part of their minimum wage, and, added the restrictions on youth employment in the agricultural industry to children under the age of 16 exempted to youths employed by a parent.

In 1974, the overall coverage for the FLSA expanded even more and marked the biggest federal wage increase that has been implemented up to this point. The Fair Labor Standards Amendments of 1974 extended the coverage to most federal, state, and local government employees. This included fire protection and law enforcement officials who received advantages in regards to overtime pay. These agencies can be given a full or partial exemption from overtime determined by several people employed or by a prolonged work period. At this point, the federal wage was increased from $1.60 per hour at the end of 1968 to $2.00 per hour in May of 1974 per the United States Department of Labor. In 1985, the FLSA allowed state and local governments to offer the option of either compensatory time off or overtime pay, and in the 1989 amendments, minimum wage coverage was expanded to employees employed by businesses earning annual sales more than $500,000.

2007 Amendments

The federal minimum wage since 1938 has increased from $0.25 per hour to $7.25 per hour as of July 2009. Along with extending coverage, the amendments also brought periodical changes in the level of the federal wage price floor. The federal wage has always been increased, in many instances increased within short time frames, and has never declined. The most recent increase came in 2007 under the Bush Administration under the US Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act of 2007. Under this act, there is the Fair Minimum Wage and Tax Relief in Title VIII which would increase the federal minimum wage a total of three times up until July of 2009. It would increase the current 2007 wage of $5.15 to $5.85 an hour in 2007, from $5.85 to $6.55 an hour in 2008, and from $6.55 to $7.25 and hour in 2009. Today, this federal rate still stands which has brought up major discussions regarding the current federal minimum wage. Table 1 below shows precisely when and how much the federal wage has been increased throughout its history.

Table 1: Federal Minimum Wage Increases

Table A-1. Federal Minimum Wage Laws

Public Law and Date Enacted	Wage Rate	Effective Date of Wage Rate
P.L. 75-718, enacted June 25, 1938	$0.25 0.30 0.40	October 1938 October 1939 October 1945
P.L. 81-393, enacted October 26, 1949	0.75	January 1950
P.L. 84-381, enacted August 12, 1955	1.00	March 1956
P.L. 87-30, enacted May 5, 1961	1.15 1.25	September 1961 September 1963
P.L. 89-601, enacted September 23, 1966	1.40 1.60	February 1967 February 1968
P.L. 93-259, enacted April 8, 1974	2.00 2.10 2.30	May 1974 January 1975 January 1976
P.L. 95-151, enacted November 1, 1977	2.65 2.90 3.10 3.35	January 1978 January 1979 January 1980 January 1981
P.L. 101-157, enacted November 17, 1989	3.80 4.25	April 1990 April 1991
P.L. 104-188, enacted August 20, 1996	4.75 5.15	October 1996 September 1997
P.L. 110-28, enacted May 25, 2007	5.85 6.55 7.25	July 2007 July 2008 July 2009

Source: CRS Report RL33791, *Possible Indexation of the Federal Minimum Wage: Evolution of Legislative Activity*, by William G. Whittaker.

These discussions entail if the wage should be increased, and if so by how much and when, and what would happen to minimum wage workers if the rate were to be increased. It is also important to take into primary consideration that as of 2016, approximately 29 states including the District of Columbia, have minimum wage levels higher than the federal wage according to the Department of Labor. The current debate has circulated the levels

of state and federal wages and what will happen to the national economy if and by how much wage levels are increased.

2.3 Who are Minimum Wage Workers?

To recap, the Fair Labor Standards Act covers the enterprise and the individual representing a 2013 value from the US Department of Labor to be approximately 84% of the labor force in the United States. Enterprise coverage consists of businesses whose annual sales are equal to or greater than $500,000 as previously stated. This type of coverage also applies to hospitals or medical care institutions, schools, and federal, state, and local governments regardless of sales as noted prior. If the business does not meet the $500,000 annual sale threshold, the individual coverage exceeds to all employees who are involved in interstate commerce or produce for domestic trade which can be broadly defined in the US Department of Labor's Coverage Under the Fair Labor Standards Act.

An overall 2015 data analysis conducted by the Bureau of Labor Statistics shows that workers who earn minimum wages at the state or federal level tend to be younger workers earning at or below current wage levels. The 2015 data from the Bureau of Labor Statistics is derived from the Current Population Survey, CPS, of the US Census Bureau that surveys 60,000 households on a monthly basis. From this data, it is observed that about 78 million American workers over the age of 16 represent about 58% of all salary and wage workers in the United States. The data collected is analyzing workers who earn at or below the current federal wage. In 2015, a total of 2.6 million workers earned at or below the current federal wage of $7.25 which is 3.3% of all hourly paid work. Since the data from the BLS was acquired in 1979, the percentage of all hourly paid employment has been declining

throughout the years. In 2014, the percentage of workers earning at or below the federal wage was 3.9%, and in 1979 this percentage was at 13.4%. It is important to note that from the data collected from the CPS is based on the hourly wage households report leaving out overtime pay, tips, and commissions. It is also important to note that the data is derived from the federal wage, and not individual state minimum wages.

BLS 2016 Federal Data Analysis

One interesting resource that's used in measuring federal wage levels in the United States is provided by the Bureau of Labor Statistics which offers annual reports as to which type of individuals and industries receive and offer the federal wage level of $7.25. The 2016 "Characteristics of Minimum Wage Workers" report highlights these key details. The 2015 BLS report will be emphasized more in the contribution piece of this project because the data used for real state wages are calculated in 2015 dollars using the GDP Price Deflator, also referenced later in this paper with the federal wage. The 2016 data shows that there has been a decrease in the percentage of workers earning at or below the federal wage from 3.3% in 2015 to 2.7% of all hourly paid workers. For clarity reasons, the BLS report states that the survey conducted for 2015 and 2016 does not ask if individuals are covered by the federal wage, or individual state, or local minimum wage laws. And also, the estimates that the BLS reports are based on the hourly wage people report on in the survey, not including overtime hours, tips, or commissions.

The 2016 report highlights age, education, full and part-time status, occupation, industry, and state of residence. Employed teenagers between the ages of 16 and 19 that are hourly employed, 10% of the group earn at or below the federal wage, as well as 2%

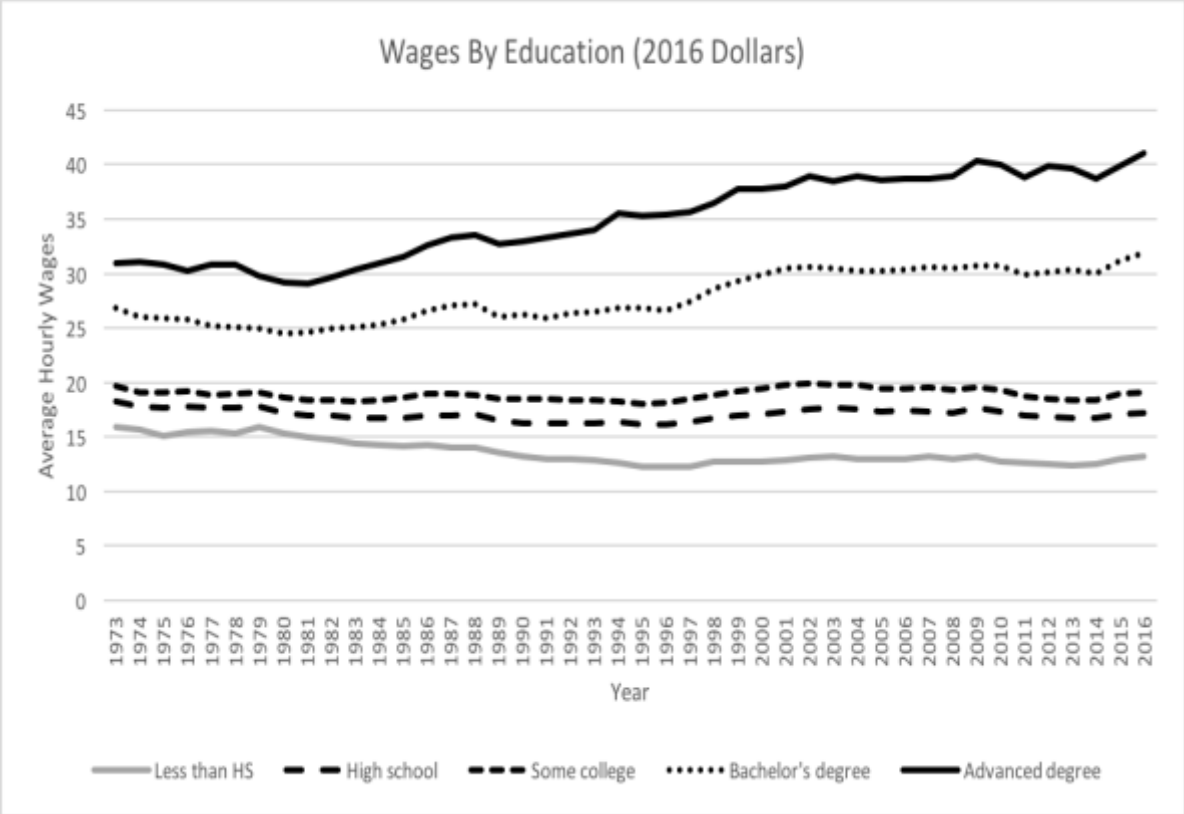
of workers at or above the age of 25. Workers 16 or older earning at or below the federal wage who do not have a high school diploma make up about 5% of hourly-paid workers, 3% with a high school diploma and no college, 3% some college or associates degree, and 2% of college graduates. Part-time workers (<35 hours per week) have a higher percentage, 6%, of workers earning the federal wage than full-time workers which is around 2%. The biggest occupation that has workers earning at or below the federal wage comes from service occupations mainly in food preparation or service related jobs. The industry that has the highest number of workers earning the federal minimum wage comes from the leisure and hospitality industry narrowing in at restaurant and fast food services. The state of residence data provided by the BLS is skewed in part because 29 states including the District of Columbia had wages higher than the federal in 2016. Mainly states in the south maintain the national wage rate of $7.25, however, states particularly on the west coast and north east have had state wages higher than the federal. The only state that has minimum wage laws lower than the national is Wyoming but the Federal rate still applies to minimum wage earners in that state. The BLS report can draw a general conclusion that workers earning the minimum wage tend to be young adults seeking entry into the workforce, and are less educated.

EPI Data

The highlights from the BLS data can be even further enhanced by the data collected by the Economic Policy Institute, EPI. The EPI data analyzes various government databases to compare wages with economic variables such as gender, race, age, education, and inequality. The data recorded by the EPI has been collected since 1973 and has been

converted to 2016 dollar amounts. The interesting aspect of the EPI data is that it does not directly identify data specifically for minimum wages. The data does show aspects that can be represented by wage and hour data giving outcomes that show wage inequality between various categories of individuals as shown in Figure 1 below representing wages based on education.

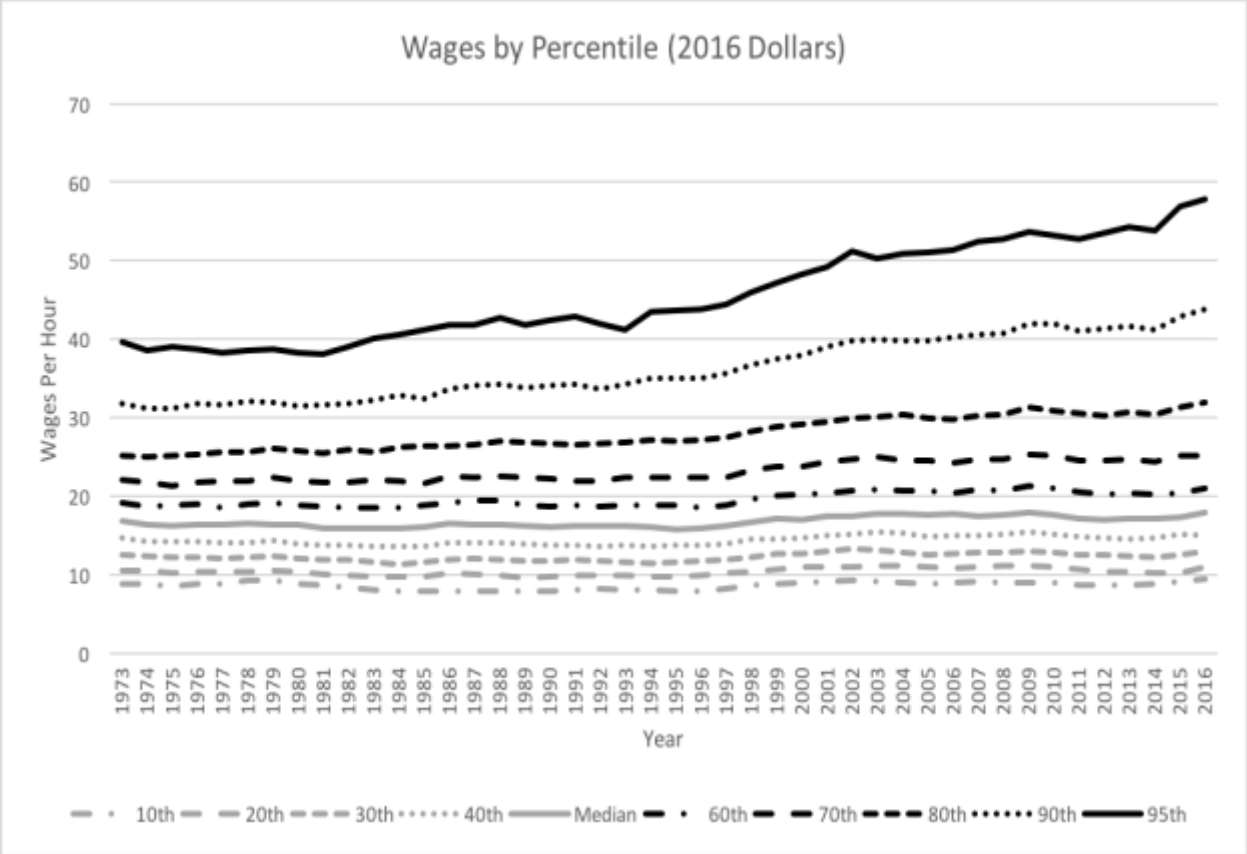
Figure 1: EPI Average Hourly Wages by Education Level



The EPI data is extremely interactive as this graph can be manipulated to show different variables such as gender and race. It is an incredibly helpful tool for economists to use to show various gaps in this area of study. Individuals with less than a high school degree earned a little more than $13 in 2016, but the historical trend has decreased since the data

was collected in 1973. It also shows individuals with a bachelor or advanced degree have historically been on the positive side earning almost increased continual hourly wages. High school and some college individuals remain to stagnate through the years between $15 to $20 wages per hour. The main area of focus that pertains to this project comes from the less than high school, high school, and some college distribution groups because this fits the demographic of individual earning minimum wages. The same concept can be taken from EPI's data breaking down wages by percentiles shown in Figure 2 below.

Figure 2: EPI Hourly Wages by Percentile



The data provided in this figure, much like the previous, can also be manipulated to show gender and race. It is observed here that wages in the top three percentiles have increased through time, while wages in the lower percentiles remain to stagnate. The first six percentiles are shockingly low compared to the higher percent of hourly wages between $10 and $20. The 10th percentile in 2016 is in fact below $10 where workers here earn $9.35 on average. Again, the EPI data is important to consider when looking at minimum wages paying particular attention to the population lower than the 50th percentile. The EPI data stated above is to complement the annual BLS reports on minimum wages.

III. Minimum Wage and Employment: Literature Review

This chapter is a literary review described through past economic literature about the introduction of minimum wages in the United States economy and generally employment variables. This section will examine previous studies done based on minimum wage and what types of factors certain wage have on overall employment levels in particular regions pertaining to individual studies. Section 3.1 will show how minimum wages work and what effect they will have on economic indicators highlighting different labor markets and nominal and real minimum wages. Section 3.2 shows an in-depth analysis of the history of thought on minimum wages provided by Alan Krueger indicating the differences that different schools of thought have on the topic of minimum wages. Following, Section 3.3 offers a classic literature review on Myth and Measurement: The New Economics of the Minimum Wage by David Card and Alan Krueger focusing and drawing conclusions on various studies done on minimum wage economic literature up to their writing. The section will also offer and basic overview of the literature surrounding Myth and Measurement provided by Arindrajit Dube. Sections 3.4 and 3.5 offer more recent case studies done by various economist on the topic which concludes with one of the more recent trends in minimum wage literature which is individual sub-state or city implemented minimum wage laws. This chapter is meant to emphasize and portray the microeconomic literature trends of research. Section 3.6 is a short explanation as to what would happen if the federal wage is raised to $12 per hour by 2020.

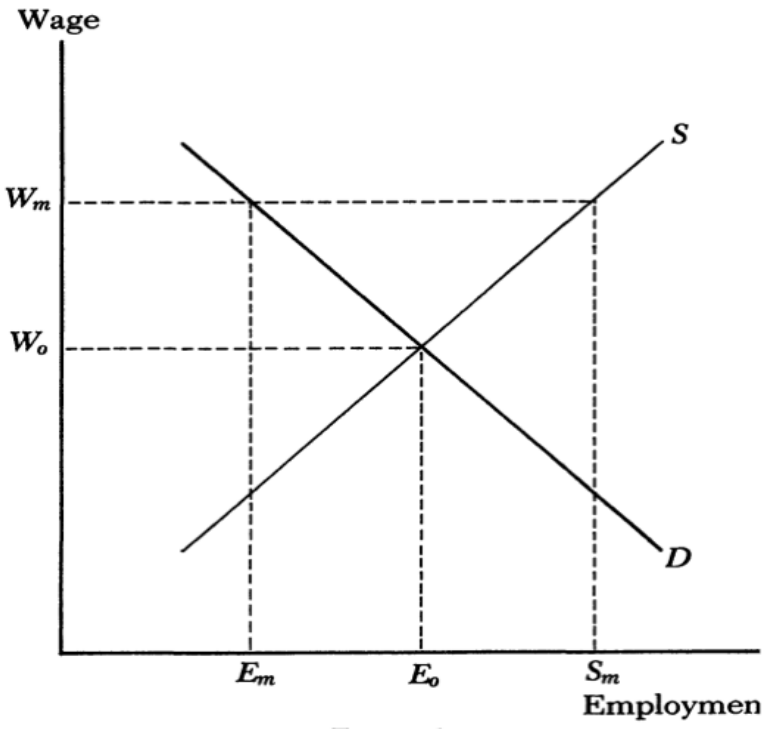
3.1 Minimum Wage Economics

Since the implementation of the Fair Labor Standards Act, the United States has enforced and maintained basic minimum wage laws that generate income for individuals who are in the workforce. The act promotes higher employment levels in the economy simply by offering a wage price floor for generally low skilled jobs that don't require a lot of experience. This is why many minimum wage jobs are typically aimed towards younger employment because the skills that these jobs require for a potential employee can be taught without a particular degree or high level of education. What is the importance of instituting a minimum wage? The minimum wage, in essence, is a price floor that is enforced to ensure that employers will pay their employees at a level equal to or greater than the determined minimum wage level. When workers are guaranteed payment, it will enhance the overall supply of labor attempting to drive more individuals into the workforce. Recent debate, whether it being economic or political, over increasing minimum wage levels has been brought to attention over the past few years. The questions surrounding the debate are narrowed not only at what effective increase will have on employees and employers but the overall economy as a whole. Before looking at the questions surrounding a potential minimum wage increase, it is first important to understand the economics surrounding the minimum wage.

Previous economic analysis surrounding the minimum wage draws various advantages and disadvantages from a variety of viewpoints. The classic equilibrium of a free market wage that is set between the optimal wage and employment levels can be derived from the underlying supply and demand of labor principles. The optimal equilibrium can be determined where the supply of labor is equal to the demand for labor resulting in a free

market wage which is industry determined. When there is a set price floor on wages, such as a minimum wage, the quantity of labor supplied is greater than the quantity of labor demanded to generate a surplus of labor or unemployment level within the labor market resulting in what is known as a competitive labor market as shown in Figure 3.

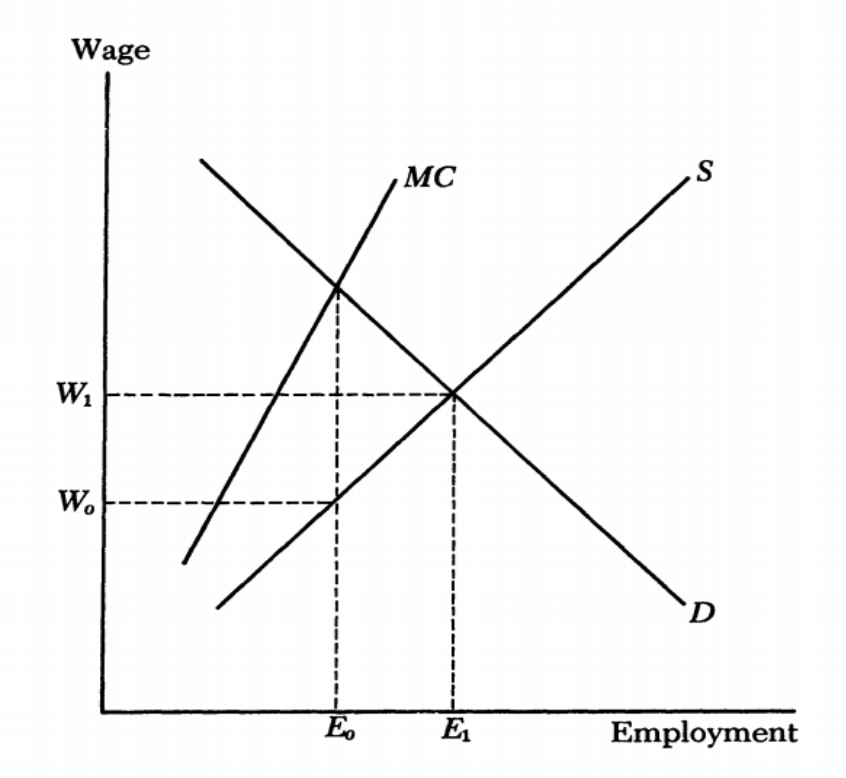
Figure 3: Minimum Wage Impact on Employment and Wages



Other factors can influence employment levels in the competitive labor market when a minimum wage is considered according to Brown, Gilroy, and Cohen (1982) but discredited by Card and Kruger (1994). Such variations include monopsony factors, or the monopsony labor market model, where one employer controls their company's labor demand and thus the price of that labor. This is where labor is relatively immobile and

setting a minimum wage would increase employment as shown below in Figure 4 in a monopsony labor market with the minimum wage which will be explained further.

Figure 4: Monopsony Labor Market



The monopsony labor market is an example of where there is a single employer that offers wages to a given number of employees to maximize revenue. In the monopsony model, employers are wage makers where they can set their wage levels and adjust for employment. The difference between the competitive labor market model and the monopsonist model is that employment and wages are set at W_0 and E_0 because of the marginal cost curve, and employment levels and wages are smaller than in the competitive model. In the *Myth and Measurement* example of a low, or minimum wage dynamic

monopsony model, Card and Kruger (1994) argue that some employers have higher labor costs than others in minimum wage industries because of employee retention and productivity margin calling this a dynamic monopsony. In short, where companies offer a little bit more than the wage floor to retain a firm's recruitment and retention of employees. Other shock effects are another force that determines employment levels where a potential increase in wages increases the employer's productivity to offset the wage raise. If firms fail to minimize their costs, then this would then lead to companies cutting their costs by laying off their workers leading to unemployment. Other factors included in Brown, Gilroy and Cohen's analysis are heterogeneous workers where different quality workers receive the same wage because lower skilled workers require greater effort affecting overall wage distribution. The minimum wage in this model has two significant effects. The first is the disequilibrium caused by the minimum wage will lead to job loss because the labor is too expensive for employers, and the second consists of a general rise in prices affecting product and labor demand in the competitive labor market model.

Labor Markets

Labor market levels vary across different industries. It is easy to say that the professional sports labor market is extremely different than that of the fast food labor market, or restaurant labor market. In the sports labor market, the demand for incredibly talented athletes is extremely high, but the supply of those athletes is minuscule which is why a professional sports team can afford to spend millions of dollars on a particular athlete because the team is generating extreme profits based on that player and overall team's performances. The player has a particular skill set that only a specialized few possess. The

same thing can be said for doctors or engineers. In the fast food labor market, workers need little to no skills set to be hired. The demand for these workers in this type of industry is necessary, but not nearly as needful as a sports team would need for a player. The labor in this industry can be hired for a far less amount because it is simply easier to find labor in this industry mainly through voluntary exchange between the employer and the employee resulting in a low wage. Therefore, people who have minimum wage jobs tend to be teenagers or individuals with little education. These occupations are the jobs where the minimum wage comes into play resulting in the disequilibrium of employment.

Nominal and Real Wages

The last time the federal minimum wage was raised was in 2009, where the federal wage was pushed up to $7.25 per hour. Raising the minimum has meant well especially for low-skilled workers who are currently earning it. However, this number is only the nominal value. There are three different ways to measure real wages. The values provided range from the inauguration of the federal wage for the consumer price index and the GDP deflator. The consumer price index research using current methods, or CPI-U-RS, have values provided from the beginning of the index during the late 1970's. The graphs for the

three different real wages, adjusted to December 2015 dollars, can be found below starting with the consumer price index in Figure 5.

Figure 5: Minimum Wage: CPI

Using the consumer price index in agreement with the nominal wage is critical to analyze the consumer price index real wage. The CPI measures changes in prices paid by urban consumers for goods in services, measuring for inflation. By using the Bureau of Labor Statistics CPI data since 1938, the real federal minimum wage can be calculated in 2015 US dollars noting that the federal wage rate increase in 1950 from ¢40 to ¢75 was the last notable time that the real wage dipped below $6 per hour. Another data source that the BLS offers is the CPI-U-RS as stated prior which attempts to recalibrate CPI data beginning in 1978. Meaning that the BLS attempts to recognize inflationary changes that were not

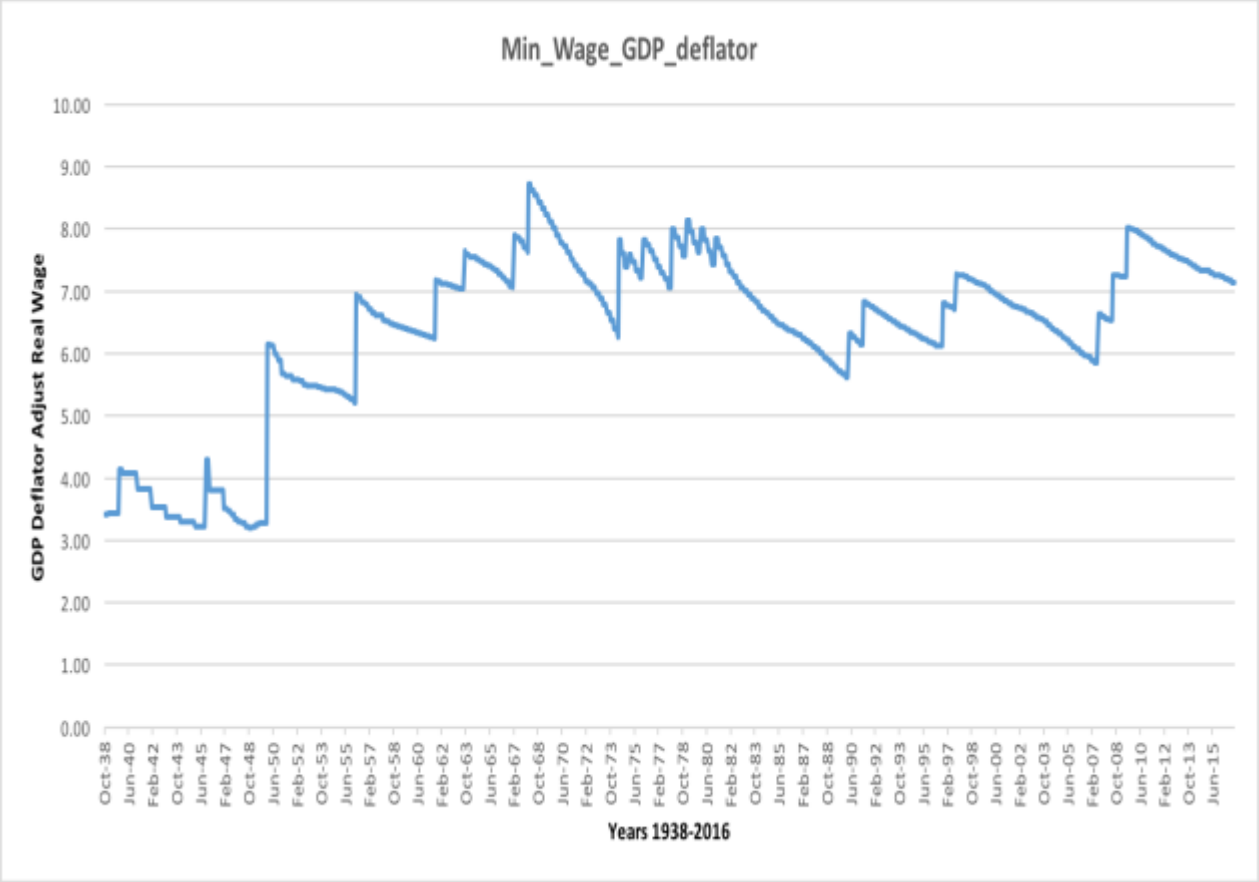
considered during the compiling of the CPI such as safety or comfort levels. Beginning in 1978, the CPI-U-RS can be seen below in Figure 6 below.

Figure 6: Minimum Wage: CPI-U-RS

The real CPI-U-RS data above shows consistency with the CPI data in figure 2. Here the fall in the real CPI-U-RS wage is observed adequately during the Reagan administration in the 1980's as well as clearly showing the increases in the nominal wage during the late 1990's and late 2000's. The graph also shows how the real wage rarely dips below $6 per hour much like the CPI figure. The GDP deflator, or implicit price deflator, graph as shown below is used much like the CPI and CPI-U-RS graph for inflation. The GDP deflator measures the level of prices of all new and final domestically produced goods and services, and unlike the CPI, the GDP deflator is not based on a fixed amount of goods and services

and depends on consumption and investment patterns. The GDP deflator graph for minimum wage is shown below in Figure 7.

Figure 7: Minimum Wage: GDP Deflator

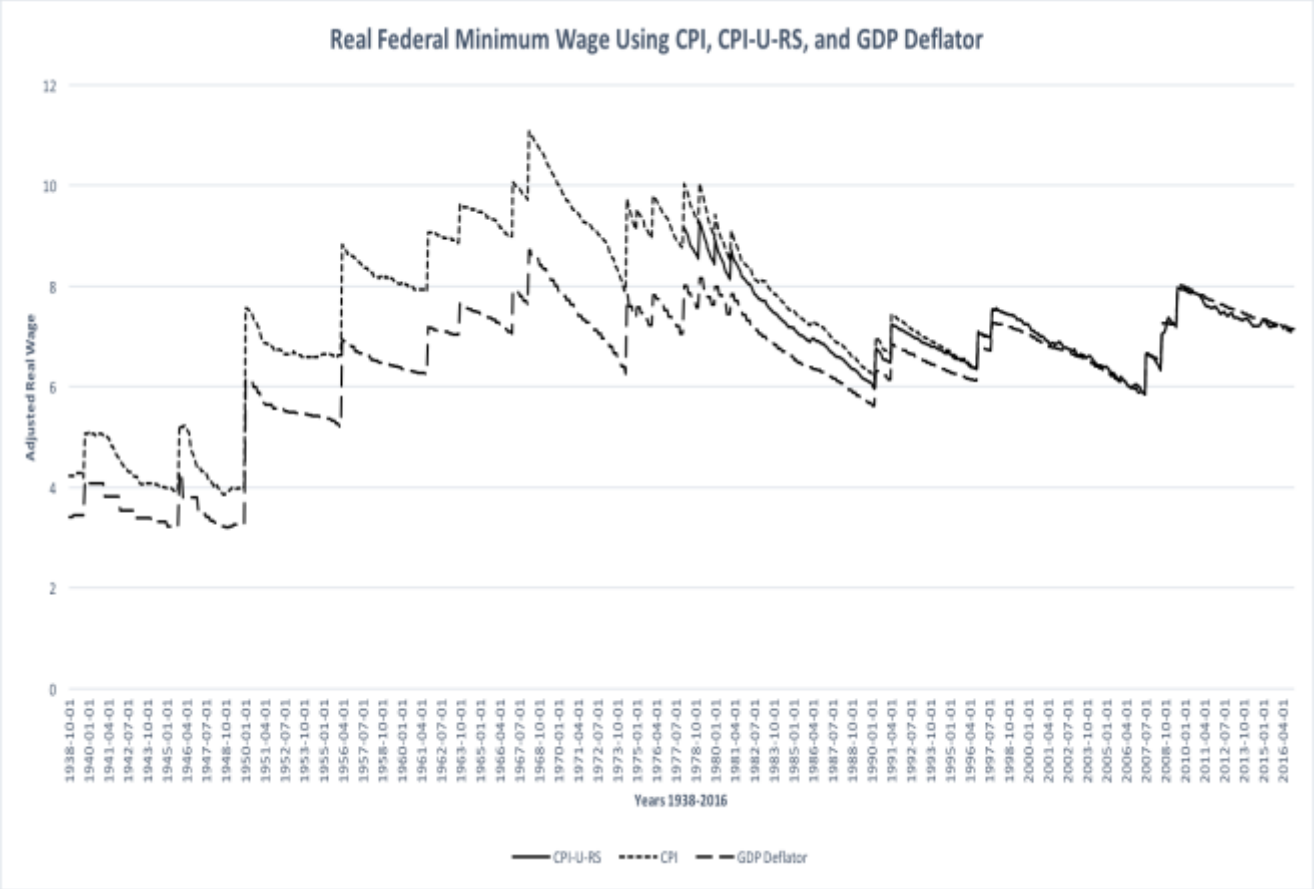


By using data from the US Bureau of Economic Analysis, the above graph shows the national real wage GDP deflator beginning in October 1938. From 1938 to 1946, the data collected for the GDP deflator was annual until the data set changed to quarterly data starting in 1947 up until December of 2016. The data here compared to the CPI adjusted in figure 2 is more compressed staying within the range and never expanding outside of the CPI minimum wage. Much like the CPI and the CPI-U-RS graphs, the real wage rarely

dips below $6 per hour but also rarely exceeds $8 per hour as observed in the 1st quarter of 1968.

To make the three different deflators more visually appealing to the reader, the table below in Figure 8 shows the CPI, CPI-U-RS, and the GDP Deflator together from 1938.

Figure 8: Real Federal Wage Using CPI, CPI-U-RS, and the GDP Deflator



After the 1980's, the data shown above begins to fall into place with one another. The variation can be seen between the CPI and GDP Deflator before the early 1990's, however, both the GDP Deflator and CPI data shows the same peaks and valleys as one another. The minimum wage had the highest purchasing power, out of all inflators, observed in the CPI

data series in 1968. The CPI-U-RS real wage favors the CPI wage lying closer to the CPI wage. It is observed that after 2000 the three wages seem to match on another to the naked eye. The GDP Deflator will be significant later in this paper because it will be used to adjust for individual state wages at the 2015 level.

3.2 Minimum Wage History of Thought

Many economists prior and during the signing of the FLSA did believe that providing a wage floor on a national level would be beneficial and that the economy would function better. The wage floor improves employee confidence and productivity which would lead to more individuals to be more involved in the labor market. Alan Krueger (2015) paints a clear picture as to how economists have evolved their understanding of the wage floor since its beginning stages in his piece on the *History of Economic Thought on the Minimum Wage*. Krueger notes that institutional economists believed that along with a wage floor other real world factors and constraints like morale, employee loyalty, turnover, bargaining power, and relative pay also need to be taken into consideration. Beliefs concerning employer's dates back to the father of economics, Adam Smith, who believed that employers would do whatever was possible to keep wages as low as possible and that regulation would always be directed to support the workmen instead of their 'masters.' Smith makes an excellent point regarding wages and societal structure saying, "No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable." (Smith 1776: Book 1, Chapter 10) The arguments that Krueger is citing in his work not only provide evidence that the economy functions better with a fair wage but also is supportive of morale and just arguments supporting a fair wage.

During the 1940's Chicago economist and marginalist, George Stigler spoke out against the institutionalist view of the minimum wage. Krueger recalls that Stigler stated that the wage floor reduced employment and does not diminish poverty through how competitive markets should normally function. In these market models, companies had no preference to set pay and workers received pay based on their output levels while the institutionalists used data based off real business behavior and consultations with employers arguing against a fall in employment levels.

One significant innovation in the 1960's and 1970's came in regards to the minimum wage debate when computer technology became more advanced which was the use of econometrics. Krueger notes that this was a major deal, particularly during the Reagan administration from 1981 to 1989 after the 1982 study done by Brown, Gilroy, and Kohen which concluded that a 10 percent increase in the minimum wage generated a 1 to 3 percent decrease in teenage employment levels. Because of these results along with Stigler's argument the minimum wage was never raised during the Reagan administration. As more data was collected and added to the econometrics models in the same study the most recent time-series were then finding no link between a change in the minimum wage on employment seen in Wellington (1991).

Card and Krueger then tackled the collection of data and the ongoing debate over the minimum wage in one of the biggest studies done on the topic in recent decades. The two observed employment in the fast-food industry in New Jersey and Pennsylvania who share the same border but have different wages. The study concluded that after New Jersey had raised their minimum wage while Pennsylvania stayed stagnant, the two found the employment in new Jersey did not fall and discovered that there weren't any

(dis)employment effects. This particular study will be analyzed in greater detail during the next section of this chapter. Krueger then goes on to acknowledging studies that have been concluded recently that again show no employment effects along with increased earnings which will also be looked at later in this literature review. He concludes stating that throughout history, the minimum wage has done a vast amount of good than harm and that the federal wage should be raised again during the Obama administration to make up for the Reagan years and that honest work should be rewarded with fair pay.

Debate

The wage debate over the current years has been intense discussions that have led to a split amongst policymakers on whether to increase or maintain the current wage. The discussion is generally centered around income inequality and potential job loss for low-skilled workers if the wage were to be raised. Conservative policymakers and neoclassical economists would tend to point to their core economic beliefs saying that wages should be free-market determined to increase the employment rate. While liberal economists and policymakers will say that there is little to no relation towards minimum wages and the employment rate as seen in David Card and Alan Krueger's studies in *Myth and Measurement: The New Economics of the Minimum Wage, 1995*. Minimum wage advocates throughout its history have always been fighting an uphill battle to maintain or increase the wage, and recent economic literature has provided areas of study where implementing an increase in either state or federal minimum wages has been derived out in either a positive or negative light.

3.3 Myth and Measurement

Most of the literature on the topic can be categorized into two poles: the traditional, microeconomic neoclassical, conservative understanding of minimum wages as a burden and complication to the natural determination of wages by the economy, and the more modern, liberal view of minimum wages as a national relationship between labor markets, advocated for by liberals. A large part of the movement for a higher minimum wage, or a living wage, is perpetuated by a call for morality, however rational or not. This literary summary and analysis of minimum wages and employment is based on arguably the most influential piece of literature contributing to the field minimum wage economics, the 1995 study on the various effects of minimum wage, *Myth and Measurement: The New Economics of the Minimum Wage* by David Card and Alan Krueger. Both who studied at Princeton, home of saltwater, liberal economists. Myth and Measurement are significant because it discusses the effects of minimum wage on both unemployment and inequality, specifically how it affects the distribution of wages. While the relationship between minimum wages and unemployment is the forefront of most economic journals, little was being written about the distribution of wages in 1995, especially not as a function of the minimum wage. The most contemporary studies to the work of Card and Krueger is Burkhauser, Couch, and Wittenburg (1996), who write a brief response criticizing the broadness of the study, as well as DiNardo, Fortin, and Lemeiux (1995), who agree strongly with Myth and Measurement. They conclude that the decreases in real minimum wages explain a great deal of increased inequality between 1979-1988, especially for women.

While the question of how minimum wages affect unemployment has been asked since the FLSA was passed in 1938, the studies of David Card distinctly bucked the trend. Having published numerous studies in this field in the time leading up to the publication of their book in 1995, such as a 1992 case study of minimum wages and employment in California among teens from 1987-89. Card on another paper in 1992 titled "Using Regional Variation in Wages to Measure the Effects of the Federal Minimum Wage," concluded that a Federal increase in minimum wages showed "no evidence of corresponding losses in teenage employment or changes in teenage school enrollment" (Card 22). At the time, such findings were in direct contrast with the fundamental theoretical beliefs held by the neoclassical free-market economists. As shown in Table 2 below produced in Brown, Gilroy, and Kohen (1982), numerous theories attempting to predict the effects of minimum wage, as 24 forecasts were made between 1970 and 1991. While most of the predicted changes results are not even depicted in the table, the ones that show little significance.

Table 2: Brown, Gilroy, and Kohen (1982) Forecasts on Minimum Wage Effects

TABLE 5–1
ESTIMATED EFFECT OF A 10 PERCENT INCREASE IN THE MINIMUM WAGE ON TEENAGE EMPLOYMENT AND UNEMPLOYMENT, 1970–1991

Study	*Percent Change in Teenage Employment*	*Change in Teen Unemployment Rate, in Percentage Points*
Kaitz (1970)	–.98	–.01
Adie (1971)		2.53
Moore (1971)		3.65
Kosters-Welch (1972)	–2.96	
Lovell (1972)		–.00
Adie (1973)		.52
Lovell (1973)		–.25
Kelly (1975)	–1.20	
Gramlich (1976)	–.94	
Kelly (1976)	–.66	
Hashimoto-Mincer (1970); Mincer (1976)	–2.31	.45
Welch (1976)	–1.78	
Ragan (1977)	–.65	.75
Mattila (1978)	–.84	.10
Freeman (1979)	–2.46	.00
Wachter-Kim (1979)	–2.52	.51
Iden (1980)	–2.26	
Abowd-Killingsworth (1981)	–2.13	
Betsey-Dunson (1981)	–1.39	
Hamermesh (1981)	–1.21	
Ragan (1981)	–.52	
Brown-Gilroy-Kohen (1983)	–1.14	.01
Solon (1985)	–.99	
Wellington (1991)	–.63	

SOURCE: Brown, Gilroy, and Kohen (1981), updated by author.

Card and Krueger's work on wages and employment first appeared together in 1994, when they coauthored a case study on "Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania," which would go on to be the

basis of the case studies presented in Myth and Measurement. In their cross-sectional analysis of minimum wage hikes in states that share borders without minimum wage hikes, they point out that when a state raises their minimum wage, that state is essentially in competition with other states, and that minimum wage hikes have little effect on employment. Previous cross-sections of teenage employment and the minimum wage (Edward Kalachek, 1969; Arnold Katz, 1973) concluded that higher wages lowered teenage unemployment, however only slightly among the white teenagers surveyed. Brown, Gilroy, and Kohen (1982) add that the results of these studies do not show the effects on black teenagers, who they argue would be affected even more adversely. Secondly, the work was significant in providing a unique contribution to the field in its analysis of the minimum wage on wage distribution. As the study of wage inequality was only growing in popularity during the 1990's, Card and Krueger's 1995 book put forth ideas on how the distribution of wages was formatted in this country. They showed that "empirical results suggest that the most recent round of increases in the federal minimum wage had a narrowing effect on the distribution of wages and family earnings and that it may have led to a modest reduction in the rate of poverty among workers" (308).

Their main case study focused around New Jersey, as the state raised their minimum wage while neighboring state Pennsylvania did not, not only did employment of teenage fast-food workers has no influence from the recent hike, teenage, fast-food industry, minimum wage employment increased in New Jersey. This study is looked at as the reference point of most recent arguments advocating raises in the minimum wage. This includes Paul Krugman's New York Times article "Liberals and Wages" (2015), in which he writes "there's just no evidence that raising the minimum wage costs jobs, at least when

the starting point is as low as it is in modern America," citing Myth and Measurement. Notably, such a case study also circulated the idea that minimum wage increases were not only benign but that they could actually increase

Myth and Measurement 21 Years Later

It has been some time since Myth and Measurement has been published, and numerous studies have come out of the woodwork after the fact to input their two cents on the subject. The book came with the iconic study of the fast-food industry in New Jersey and Pennsylvania testing employment levels using regional variation. Since then, Arindrajit Dube (2017) has come out with a recent analysis overviewing the book and highlighting aspects of the writing and findings that have changed throughout time. Dube notes that from the book, the use of geographical proximity in comparing wages, employment, etc., is still an area of research that can be trusted when comparing wage increases throughout states. Another area that he touches upon search friction with the labor market where either it 's hard to hire employees, or it is difficult for individuals to find a job. Dube also acknowledges that most of the literature and studies were done after Myth and Measurement tended to be more biased and more likely to be published.

Myth and Measurement paved the way for recent economic literature to emerge out of the depths as Card and Kruger began using regional variation with a quasi-experimental design for policy change. During the time of writing, state minimum wage laws started to gain ground drawing massive amounts of attention to the New Jersey-Pennsylvania employment study. Regional variation has been used as a factor in countless studies but the difficulty that lies within today comes from states in the northeast and west that have

higher state wages. Dube indicates that it is difficult to compare states like Massachusetts and Texas based off variables such as migration where in Texas, immigration is a significant contributor to employment levels mainly dealing with low-skilled versus high-skilled labor. The issue the Dube has with current literature is that most estimates involving (dis)employment effects have too many control variables for state-specific trends.

Another problem that most economists have with Myth and Measurement is that the literature and findings only account for short-run variables. Dube (2010) found this to be a minimal effect when testing for long term effects on the border discontinuity design of about 4 or 5 years where the study concludes that employment estimates are relatively small accounting for long-term effects. The literature from the past decade tends to go back and forth between minimum wage and employment levels and how employment is affected. Various minimum wage studies will be analyzed throughout the next part of this chapter. It is important to shed light on Dube's account on minimum wage literature after Myth and Measurement. New strategies and practices have emerged in the literature to compare treatment and control groups. The more questionable studies involving to what Dube notes as 'questionable control groups' tend to point the finger at increased minimum wages causing layoffs and collective job loss. Later referenced in this paper, Clemens and Wither's (2016) study concludes that low-wage workers during the 2007-2009 federal wage increase had a trend of losing jobs. Meanwhile, Zipperer (2016) countered and stated that the estimates provided in this study are smaller when accounting for regional distinctions of the Recession.

21 years later Myth and Measurement has stood the test of time. It has revolutionized the way economists look at and portray labor markets. The following sections in this

chapter will show a broader range of studies and how the minimum wage is being depicted by economic literature. It will include a summary of findings involving various approaches to the topic.

3.4 Case Studies

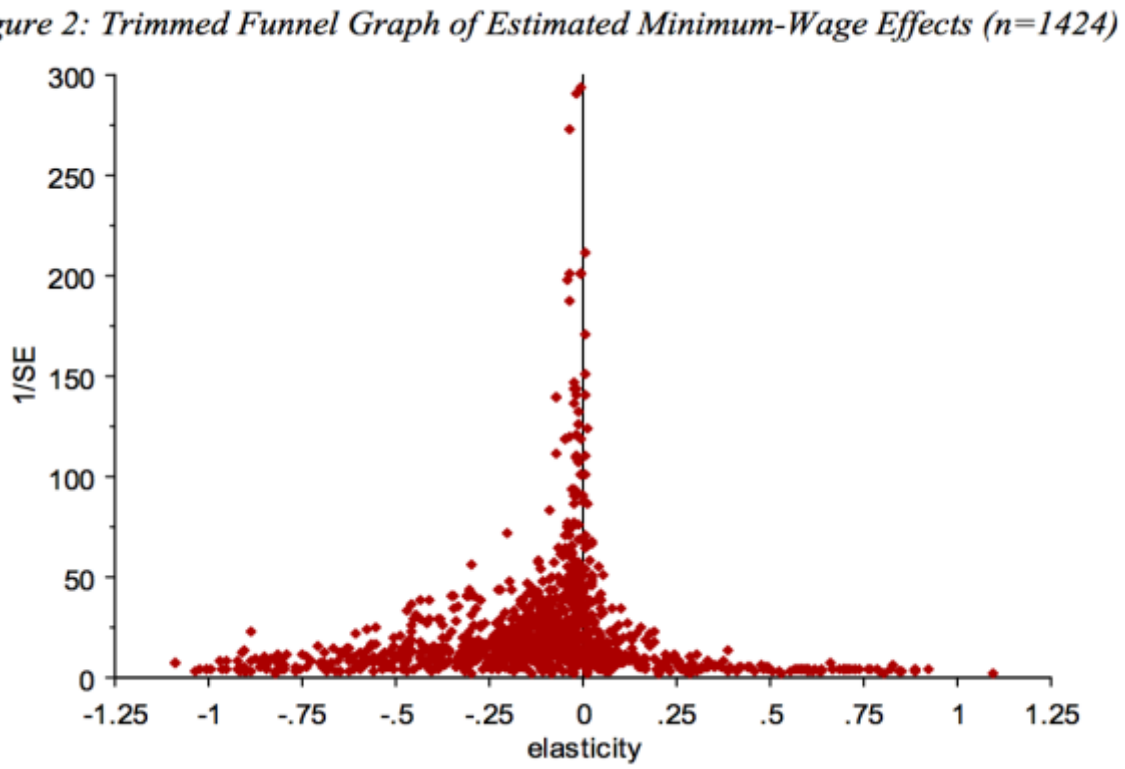
Core economic beliefs have heavily influenced current political ideology on minimum wages by neoclassical and progressive economists. The neoclassical's believe that worker's productivity should determine wage levels and that having a wage level would decrease employment for particularly low-skilled workers. Liberal economists believe that implementing minimum wages would prevent the mistreatment of low-skilled workers, encourage worker's productivity, and would overall increase aggregate demand. Current research is narrowed in on precisely how minimum wages affect different types of employees and industries. Workers earning minimum wages have different skills and implementing a minimum wage will cause employers to employ workers with a higher skill set creating a 'labor-labor' substitution effect, Neumark (2015). Neumark also states that minimum wage policy for the lowest skilled workers is of great importance because the minimum wage is supposed to target that particular group of employees. Combining data sets from various studies using only national variation in the minimum wage, Neumark finds elasticities for teens and young adults as -0.1 meaning that a 10% increase in the wage floor reduces teen employment by 1%. And from a study done analyzing various minimum wage studies by Neumark and Wascher (2007), they concluded that about 2/3rd's of the studies examined found evidence of job loss associated with low-skilled workers between state and federal wages. Neumark finds his 2015 analysis indicating that higher minimum

wages decrease the employment levels of teens and low-skilled workers, which mainly target the least skilled workers.

Issues Associated with Current Research

Neumark notes that recent minimum wage research using a meta-analysis of various studies has been conflicted. Conflicted meaning that studies using meta-analysis data will often tend always to have a negative elasticity. This is because prior research done on the elasticity of minimum wage analysis has been negative based off biasedness of journal editors and authors to be published. In the study done by Doucouliagos and Stanley (2009) they found an average elasticity of -0.19 in their meta-regression analysis that included 1,424 studies shown in Figure 9 below, ignoring the figure 2 on the regression title.

Figure 9: Doucouliagos and Stanley: Funnel Graph Meta-Regression Analysis



In their conclusion, Doucouliagos and Stanley stated that the real elasticity should be closer to 0, if not positive based off incorporating a double log function into their employment equation which they stated would draw a negative elasticity. Essentially saying that studies using meta-analysis cannot be utilized for critical evaluation.

Another area that can be conflicted is studies that were done that conclude that employment effects can be geographically determined. The study done by Dube, Lester, and Reich (2010) is one of the few studies that draw appropriate conclusions because it draws wage comparisons for states that share the same border. This study found that states that share borders bring employment elasticities closer to 0 and argue that other studies that compare states geographically, without accounting for distance proximity, have skewed employment level results. Minimum wage increases in states that are geographically close states with no increase are observed to have positive shock effects that obscure adverse effects on minimum wages. In Neumark, Salas, and Wascher (2014) study they found that these effects had negative elasticities of -0.1 to -0.2 for teenage workers which are greater than the elasticities of employees in the restaurant industry.

Employment Impact of the Great Recession

There have recently been a lot of written pieces coming out of the Economic Policy Institute as to how workers in states that still use the federal wage will earn a significantly less amount than workers in states where increasing and adjusting their states minimum wage laws is imminent every year or so. The fear circulates around the fact that the federal wage has remained stagnant for the past eight years. The last time the federal wage was

raised was during the Great Recession, and perhaps the fear of another recession in the future is a reason why it has remained stagnant. A paper by Clemens and Wither (2016) attempts to conclude that minimum wage increases from 2007 to 2009 were partially responsible for the fall in employment during the recession. Zipperer (2016) offers a concise commentary as to why raising the federal wage was not the reason for lower employment levels. Zipperer then shows how the study done by Clemens and Wither (2016) fails to account for industrial and geographic exposure to the recession by comparing employment difference between the federal wage, bound states, and states with higher wages during the time, unbound states. What Zipperer found in his study was that bound states, before the housing bubble, were more likely to have a higher percentage of employees working construction based jobs which were directly affected by the recession was being exposed to the collapse of the housing bubble causing a fall in employment regardless of the wage increase. The other area that Zipperer uses against Clemens and Wither were geographical reasons between bound and unbound states within their given region.

3.5 Meta-Analysis on Sub-State Minimum Wages

When there is growth in the economy, and the employment rate slightly decreases, or remains stagnant, causes real wages to remain constant or slightly decreasing. Many local and state level policymakers must tackle the idea of increasing the wage floor particularly in cities where the cost of living for individuals earning state level wages can be problematic. Cities like Seattle, Los Angeles, and New York have recently enacted an increase of minimum wages, and many other cities are not far behind from doing the same.

The cities listed above have raised their wage floor to $15 per hour to help provide for minimum wage earners in their local economies. The main issue that states and sub-states tackle are whether employment levels will diminish because of the raise in pay, fearing that industries like the restaurant and fast food services will begin to lay off workers, not hire as many needed, or start implementing technological services into the industry. Recent reports have concluded the contrary in cities and counties that have raised their wage floor saying that there is little to no employment effect.

Cities that increased their wage floor, or local minimum wage, have advantages that current federal and state wages do not. These benefits include having cities adjust minimum wages to better relate to cities cost of living. It also allows the local legislature to adjust the minimum wage when it is needed instead of waiting for the state legislature and allows for reforms like annual inflation indexing according to the National Employment Law Project's 2016 fact sheet. NELP also reported from their findings that jobs in the restaurant industry in San Francisco and San Jose increased after the minimum wage increase compared to neighboring cities that did not raise their minimum wages. SeaTac, a suburb of Seattle, was the first city to officially raise the minimum wage to $15 for jobs in the hospitality and travel industry, observed business expansion instead of predicted layoffs. NELP also reports that the region of Seattle's unemployment rate has diminished to 3.6 percent compared to the state's 5.3 percent unemployment rate as of August 2015. A summary of NELP's finding can be found on Table 3 summarizing the referenced studies done within the past decade for cities that have raised their minimum wage.

Table 3: NELP Summary of Findings

Study	Year Published	Cities Studied	Summary of Findings
"The Wage and Employment Impact of Minimum-Wage Laws in Three Cities" [8] Center for Economic and Policy Research	2011	San Francisco, CA Santa Fe, NM Washington, DC [9]	"The results for fast food, food services, retail, and low-wage establishments... support the view that citywide minimum wages can raise the earnings of low-wage workers, without a discernible impact on their employment..."
"When Mandates Work: Raising Labor Standards at the Local Level" [10] University of California-Berkeley	2014	San Francisco, CA	This book-length study of San Francisco's minimum wage, living wage, health care, and paid sick leave laws, which collectively raised the compensation of low-wage workers 80 percent higher than the federal minimum wage, found that these laws raised pay without costing jobs. Researchers found that from 2004 to 2011, private sector employment grew by 5.6 percent in San Francisco but fell by 4.4 percent in other Bay Area counties that did not have a higher local wage. Among food-service workers, who are more likely to be affected by minimum wage laws, employment grew 17.7 percent in San Francisco, faster than in the other Bay Area counties. San Francisco employers absorbed the higher costs through a combination of reduced employee turnover and improved customer service and worker productivity.
"The Economic Effects of a Citywide Minimum Wage" [11] University of California-Berkeley	2007	San Francisco, CA	"We find that the San Francisco wage floor policy increased pay significantly at affected restaurants.... We do not detect any increased rate of business closure or employment loss among treated restaurants; this finding is robust across a variety of alternative specifications and control subsamples."
"Measuring the Employment Impacts of the Living Wage Ordinance in Santa Fe, New Mexico" [12] University of New Mexico, Bureau of Business and Economic Research	2006	Santa Fe, NM	"Overall, this analysis found that the living wage had no discernible impact on employment per firm, and that Santa Fe actually did better than Albuquerque in terms of employment changes."
"Minimum Wage Effects Across State Borders: Estimates Using Contiguous Counties" University of California-Berkeley, University of Massachusetts- Amherst, and University of North Carolina-Chapel Hill [13]	2010	288 pairs of contiguous U.S. counties with differing minimum wage rates at any point between 1990 and 2006	Taking advantage of the fact that a record number of states raised their minimum wages in the 1990s and 2000s, this widely cited study compares employment levels among every pair of neighboring U.S. counties that had differing minimum wage rates at any point between 1990 and 2006 and finds that higher minimum wages did not reduce employment. This is a particularly important finding regarding the impact of higher minimum wages at the local level, as the county-level analysis found no evidence of businesses crossing borders or reducing employment in response to higher minimum wages.

Recent studies referenced by NELP portrays a general conclusion that higher city minimum wages have increased individual earning without slowing employment levels or unintended business activities such as relocation or store closings. This is in part positively associated with industries that offer minimum or low wages such as restaurants, fast food, retail, child care, maintenance, etc., being in these cities that are economically suitable for wage increases which can be shown by studies done in cities like Santa Fe and San Francisco. These areas have had local wages in place for nearly a decade.

3.6 Potential Outlook on an Increased Federal Wage

The BLS data serves as an honest assessment as to the characteristics of individuals who could benefit from a potential wage increase. People earning minimum wages in states particularly in the south that do not have higher state minimums would be the people benefitting from an increase. Since the last federal wage increase in 2009, the buying power shown in the inflation graphs of chapter three has decreased from that time. David Cooper (2015) from the Economic Policy Institute using EPI data came out with a piece that paints a broad picture as to what would happen specifically to low wage earners if the federal wage was raised to $12 by 2020. Cooper incorporates different variables that would be a net positive mainly for people and families living near the poverty threshold. The main finding that Cooper concludes within his study state that a clear majority of the population would benefit from the wage increase as low wage earners have higher incomes which would create a positive effect especially on local economies. The increase would also help close the income inequality gap between middle and low wage earners. The issue in this study that easily runs into is that Cooper's work tests for little regional variation,

remembering that most of the federal wage states tend to be in the South and Midwest where cost of living factors do vary.

The analysis up to this point seems straightforward. Raising the minimum wage can act as a push factor for individuals seeking entry into the labor force. On a case by case basis, higher wages mean higher payroll price for employers who make the decisions of either keeping its staff or giving the higher wages to individuals who have higher productivity levels or could be forced to lay off workers or even cut hours worked per individual. These actions are all meant for the employers to generate higher revenues. Not all employers are for wage increases as they see the increases as higher costs given the area. Potentially, a wage increase does have the possibility to lead to a store closing here and there, but instituting a high wage tends to weed out those businesses who aren't all in order with their books.

IV. Contribution

The contribution piece of this project will switch over from the basic microeconomic literature about minimum wages to testing and conducting a more macroeconomic approach and analysis to minimum wages. Recent studies and early indicators of rising sub-state and city minimum wages have generally reported positive conclusions on employment levels and regional stability leading into the question of whether states, on a broader level, are experiencing solid growth with respect to their wage levels. The contribution piece is concerned with putting these ideas of macroeconomic level variables to the test. To do this, the following provides an investigation to the relationship between the minimum wage and different macroeconomic indicators, such as economic growth, and the unemployment rate. The data setting consists of the 50 States and the District of Columbia over time where we test various effects of the minimum wage in a *panel* setting where each State is a cross-section.

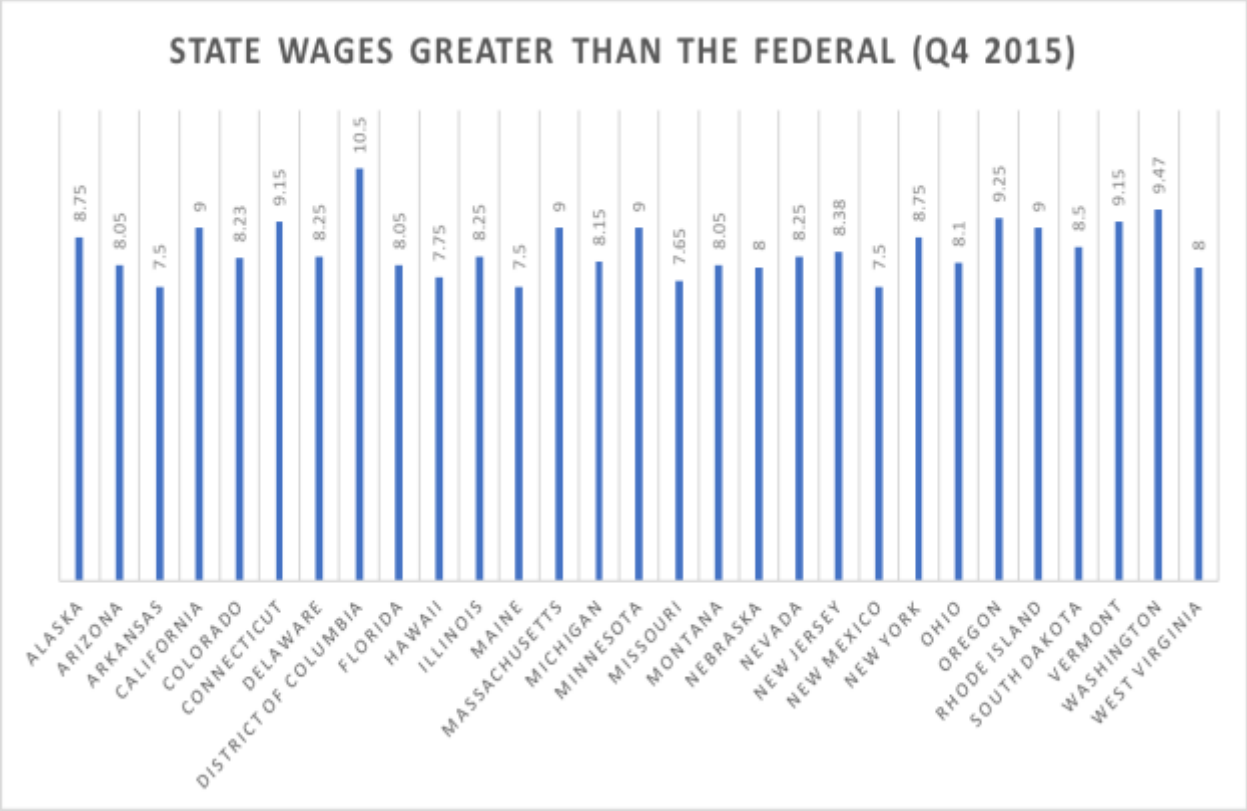
4.1 Introduction

Most of the wage literature to date has gone in depth asking questions such as if raising the minimum wage has precise employment effects on areas where the wage has been raised. Most of the literature to concludes that there is little to no significance of employment effects or shocks to increased wage. But to what extent does raising individual state wages to have on the bigger picture such as individual state economic performance? Do states see a significant impact on overall performance because of their individual wage levels? In the

previous chapter, the literature comes from a more microeconomic approach to minimum wages while the contribution and what it's going to attempt to show will be from a macroeconomic approach to the subject. Asking the specific question of whether individual levels of real state minimum wages are associated with economic performance at the state level?

More than half of the states have minimum wages that are higher than the federal rate. Some states have wages significantly higher while others, a select few like Arkansas for example, have wages only ¢25 greater than the national by the end of 2015. Washington, $9.47, had the highest minimum wage out of all the states without counting the District of Columbia, $10.50 at the end of 2015 other states can be shown in Figure 10 below.

Figure 10: State Minimum Wages Greater than the Federal



The reason why the end of 2015 is being stated is that this contribution is using 2015 at the end of the final quarter of that year, much like as what was seen prior in the price deflators. Neighboring states like Oregon and Washington draw the eye of being two states with the highest wages. The data provided above comes from an extensive data source provided by Ben Zipperer (2016) that covers state and sub-state wage changes ranging from the 1960's to bills for raising the minimum wage in 2017. Some of the states above do have wage increases for 2017 and even 2018. It is important to acknowledge the states with higher minimum wages for the next section of the 2015 BLS data report as it covers individual characteristics of minimum wage earners in the South and Midwest.

BLS 2015 Federal Data Analysis

The data from the 2015 BLS report shows how the data collected can be broken down into different groups for federal wage analysis. The data includes statistics recorded to break down and analyze specific categories of wage earners. The report highlights that 11% of teenage workers, between the ages of 16 and 19, earned at or below the federal wage compared to the 2% of employees over the age of 25. The data also shows that of all hourly wages a slightly greater percentage of women, 4%, earn at or below the federal wage compared to men, 3%. It also highlights that African Americans have a greater percentage, 4%, earning at or below the federal wage while other race categories accompany 3% individually. Education level is also broken down showing that workers without a high school diploma have the greatest population of individuals earning at or below the federal wage, 6%, while individuals with a high school diploma earned 3%. Unmarried workers

have a greater percent, 5%, of individuals earning at or below the federal wage compared to married workers, 2%. Part-Time employees working less than 35 hours per week have a higher percentage of workers earning at or below the federal rate, 7%, than full-time workers, 2%. Restaurant and food related services have the highest represented minimum wage workers in overall industries. On a regional basis, the southern states accompany a greater number of workers earning at or below the federal wage because many of these states do not have individual minimum wage rates, so the minimum wage is the federal wage. The overall analysis of the BLS data is that workers who earn or below federal minimum wage levels tend to be young, less educated, and part-time employees.

With the main highlight of BLS report that is incorporated with the question is to which states do not have higher minimum wages. These states are primarily located in the south where conservative economic literature suggests that increasing minimum wages cause employment levels to decrease.

4.2 Explanation of Data

The contribution piece is concerned with putting these ideas of macroeconomic level variables to the test. To do this, the following provides an investigation to the relationship between the minimum wage and different macroeconomic indicators, such as economic growth, and the unemployment rate. The data setting consists of the 50 States and the District of Columbia over time where we test various effects of the minimum wage in a *panel* setting where each State is a cross-section.

The data consists of using different definitions of the minimum wage (real v. nominal), different control variables (unemployment, economic growth) and different time periods

and periodicity (2005Q1-2014Q4 v. Annual 1969-2015) as well as different estimation methods (stationary, "short run" relationships v. cointegrating, and long run relationships). The goal is to cover a large ground to provide different perspectives on, and therefore robustness to, the results regarding the effects of the minimum wage.

The models shown below are consistent with the results in the literature of finding sometimes significant, sometimes insignificant, negative but always very small, macroeconomic effects of the minimum wage on either unemployment or economic growth. At the same time, the results extent the literature by considering the long run effects of state minimum wage increases, which in the panel setting is shown to have small, positive and significant, effects on economic growth and personal income.

Section 4.3 estimates a simple bivariate relationship between the minimum wage and economic growth to provide background for further investigations. Section 4.4 does the same controlling for the unemployment rate, and flips this relationship to estimate the likely effects of the minimum wage on unemployment. Section 4.5 switches the analysis to the long run. To conclude the analysis, Sections 4.6 and 4.7 continue the long run theme but use different measurements (such as disposable income and employment) and a longer sample in order to provide insights into the macroeconomic effects of the nominal minimum wage on those variables.

4.3 Growth Equations

The first model specification is a very simple panel regression of economic growth on the minimum wage. The cross-sections include the States and the District of Columbia. The data provided is available quarterly from 2005Q1 to 2015Q4. We consider the minimum wage deflated by each State's inflation estimates, symbolizing the real minimum wage by

W, and consider two metrics of economic growth: real State GDP growth from quarter to quarter (dlogY) and State real GDP year on year growth (dlog(Y/Y(-4)).

The models are as follows:

$$\Delta logY_{it} = \beta_0 + \beta_1 W_{it} + \epsilon_{it}$$

A panel regression follows of economic growth on the real minimum wage and unemployment, all measured at the State level. Using quarterly data from 2005Q1 to 2015Q4 and a simple OLS model without and cross-section or year effects, we get the following in Figure 11 below.

Figure 11: OLS Model (Real State Wage and GDP Growth)

Dependent Variable: GROWTH
Method: Panel Least Squares
Date: 05/01/17 Time: 20:00
Sample (adjusted): 2006Q2 2015Q4
Periods included: 39
Cross-sections included: 52
Total panel (balanced) observations: 2028
White diagonal standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)	0.788030	0.020598	38.25797	0.0000
LOG(W)	0.003445	0.004026	0.855884	0.3922
C	-0.005006	0.008280	-0.604600	0.5455

R-squared	0.623570	Mean dependent var	0.011369
Adjusted R-squared	0.623199	S.D. dependent var	0.030987
S.E. of regression	0.019021	Akaike info criterion	-5.085060
Sum squared resid	0.732648	Schwarz criterion	-5.076754
Log likelihood	5159.250	Hannan-Quinn criter.	-5.082012
F-statistic	1677.246	Durbin-Watson stat	1.762606
Prob(F-statistic)	0.000000		

Lagged growth was added to term to correct for serial residual autocorrelation. The

results above indicate that the real minimum wage has essentially zero effect on economic growth on the state level.

Next, the data was used to test for the existence of panel fixed (LR test) and random effects (Lagrange Multiplier tests) shown in Figure 12.

Figure 12: Fixed vs. Random Effects

Redundant Fixed Effects Tests
Equation: EQ_OLS
Test cross-section and period fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.838798	(51,1936)	0.7846
Cross-section Chi-square	44.323633	51	0.7342
Period F	13.645112	(38,1936)	0.0000
Period Chi-square	481.254316	38	0.0000
Cross-Section/Period F	6.259461	(89,1936)	0.0000
Cross-Section/Period Chi-square	512.880671	89	0.0000

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan	6.209685 (0.0127)	1861.643 (0.0000)	1867.852 (0.0000)
Honda	-2.491924 (0.9936)	43.14676 (0.0000)	28.74731 (0.0000)
King-Wu	-2.491924 (0.9936)	43.14676 (0.0000)	31.03337 (0.0000)
Standardized Honda	-2.382453 (0.9914)	44.38635 (0.0000)	22.85119 (0.0000)
Standardized King-Wu	-2.382453 (0.9914)	44.38635 (0.0000)	25.27368 (0.0000)
Gourieroux, et al.*	--	--	1861.643 (0.0000)

The results strongly indicate a misspecification of the original, simple regression, or OLS model. To counter this, we need to account for State, cross-section, random effects, as well as period fixed effects. In order to measure the presence, or lack of autocorrelation, of the random effects with the explanatory variables we then ran a Haussman test shown in Figure 13.

Figure 13: Haussman Test

Correlated Random Effects - Hausman Test
Equation: EQ_GOOD
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	2	1.0000

The Haussma test statistic indicates the lack of misspecification, and because of this, we proceed using a model with fixed period and random cross-section effects. Doing so for our equation for economic growth yields the following shown in Figure 14.

Figure 14: Fixed Period, and Cross-Section Random Effects

Dependent Variable: GROWTH
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/17 Time: 20:08
Sample (adjusted): 2006Q2 2015Q4
Periods included: 39
Cross-sections included: 52
Total panel (balanced) observations: 2028
Swamy and Arora estimator of component variances
White diagonal standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GROWTH(-1)	0.776562	0.025170	30.85225	0.0000
LOG(W)	-0.002903	0.004280	-0.678191	0.4977
C	0.008067	0.008776	0.919124	0.3581
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Period fixed (dummy variables)				
Idiosyncratic random			0.017143	1.0000

Weighted Statistics			
R-squared	0.701226	Mean dependent var	0.011369
Adjusted R-squared	0.695212	S.D. dependent var	0.030987
S.E. of regression	0.017107	Sum squared resid	0.581506
F-statistic	116.5878	Durbin-Watson stat	1.848043
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.701226	Mean dependent var	0.011369
Sum squared resid	0.581506	Durbin-Watson stat	1.848043

As stated prior, the real state minimum wage does not appear to be significant for state economic growth. The results are the same whether one considers year-on-year growth using (dlog(Y/Y(-4)) as the dependent variable shown below in Figure 15.

Figure 15: Fixed Period, and Cross-Section Random Effects (Year on Year Growth)

Dependent Variable: DLOG(Y/Y(-4))
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/17 Time: 20:11
Sample (adjusted): 2006Q2 2015Q4
Periods included: 39
Cross-sections included: 52
Total panel (balanced) observations: 2028
Swamy and Arora estimator of component variances
White diagonal standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W)	0.001582	0.004514	0.350398	0.7261
C	-0.003724	0.009255	-0.402396	0.6874
Effects Specification				
			S.D.	Rho
Cross-section random			0.000000	0.0000
Period fixed (dummy variables)				
Idiosyncratic random			0.018361	1.0000
Weighted Statistics				
R-squared	0.204283	Mean dependent var		-0.000501
Adjusted R-squared	0.188672	S.D. dependent var		0.020143
S.E. of regression	0.018144	Sum squared resid		0.654428
F-statistic	13.08652	Durbin-Watson stat		2.049880
Prob(F-statistic)	0.000000			
Unweighted Statistics				

R-squared	0.204283	Mean dependent var	-0.000501
Sum squared resid	0.654428	Durbin-Watson stat	2.049880

4.4 Growth, Unemployment and the Real Minimum Wage in the Short Run

To investigate the issue further in the analysis, we expand the previous setting by controlling for state unemployment. The provided state unemployment rate is available on a quarterly basis for all States plus the District of Columbia.

The new specification is as follows:

$$\Delta logY_{it} = \beta_0 + \beta_1 logW_{it} + \beta_2 \Delta U_{it} + \epsilon_t$$

Using the same variable definitions and sample as stated prior. The analysis continues using a panel setting with cross-section random effects and fixed period effects. The results with quarter-to-quarter and year-over-year growth are as follows in Figures 16 and 17 shown below.

Figure 16: Fixed Period, and Cross-Section Random Effects (Quarter to Quarter)

Dependent Variable: DLOG(Y)
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/17 Time: 20:16
Sample (adjusted): 2005Q2 2015Q4
Periods included: 43
Cross-sections included: 52
Total panel (balanced) observations: 2236
Swamy and Arora estimator of component variances
White diagonal standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W)	-0.003472	0.003602	-0.963939	0.3352
D(U)	-0.744654	0.153912	-4.838174	0.0000
C	0.010055	0.007316	1.374313	0.1695
	Effects Specification			
			S.D.	Rho

Cross-section random		0.001516	0.0138
Period fixed (dummy variables)			
Idiosyncratic random		0.012814	0.9862
	Weighted Statistics		
R-squared	0.198219	Mean dependent var	0.003053
Adjusted R-squared	0.182118	S.D. dependent var	0.014171
S.E. of regression	0.012816	Sum squared resid	0.359866
F-statistic	12.31063	Durbin-Watson stat	2.150674
Prob(F-statistic)	0.000000		
	Unweighted Statistics		
R-squared	0.196409	Mean dependent var	0.003053
Sum squared resid	0.364960	Durbin-Watson stat	2.120653

Figure 17: Fixed Period, and Cross-Section Random Effects (Year to Year)

Dependent Variable: LOG(Y/Y(-4))
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/17 Time: 20:19
Sample (adjusted): 2006Q1 2015Q4
Periods included: 40
Cross-sections included: 52
Total panel (balanced) observations: 2080
Swamy and Arora estimator of component variances
White diagonal standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W)	-0.009667	0.009514	-1.016107	0.3097
D(U)	-1.598634	0.353264	-4.525328	0.0000
C	0.031525	0.019396	1.625333	0.1042
	Effects Specification			
			S.D.	Rho
Cross-section random			0.010671	0.1582
Period fixed (dummy variables)				
Idiosyncratic random			0.024620	0.8418
	Weighted Statistics			
R-squared	0.298710	Mean dependent var		0.011826
Adjusted R-squared	0.284602	S.D. dependent var		0.029097
S.E. of regression	0.024611	Sum squared resid		1.234403
F-statistic	21.17253	Durbin-Watson stat		0.563212
Prob(F-statistic)	0.000000			
	Unweighted Statistics			
R-squared	0.266405	Mean dependent var		0.011826
Sum squared resid	1.459890	Durbin-Watson stat		0.476221

These figures show again that the real minimum wage does not appear to have any significant effect on state economic growth, even controlling for state unemployment levels. Economic growth has a strong influence from the unemployment rate, responding negatively and significantly to changes in the unemployment rate meaning that growth lowers unemployment.

We then flipped the equation around to investigate the possible effect of the real minimum wage on unemployment (dependent variable), controlling for economic growth. The new estimation is as follows:

$$\Delta U_{it} = \beta_0 + \beta_1 logW_{it} + \beta_2 \Delta logY_{it} + \epsilon_t$$

In the same panel setting and using the same considerations as before, we get the following in Figure 18.

Figure 18: Panel EGLS Cross-Section Random Effects (DV: Unemployment)

Dependent Variable: D(U)
Method: Panel EGLS (Cross-section random effects)
Date: 05/01/17 Time: 20:21
Sample (adjusted): 2005Q2 2015Q4
Periods included: 43
Cross-sections included: 52
Total panel (balanced) observations: 2236
Swamy and Arora estimator of component variances
White diagonal standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(Y)	-0.026639	0.005465	-4.874218	0.0000
LOG(W)	0.000364	0.000549	0.664376	0.5065
C	-0.000697	0.001128	-0.617623	0.5369

	Effects Specification	
	S.D.	Rho
Cross-section random	0.000000	0.0000
Period fixed (dummy variables)		
Idiosyncratic random	0.002451	1.0000

Weighted Statistics			
R-squared	0.664544	Mean dependent var	-4.03E-05
Adjusted R-squared	0.657807	S.D. dependent var	0.004154
S.E. of regression	0.002430	Sum squared resid	0.012938
F-statistic	98.64559	Durbin-Watson stat	1.228394
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.664544	Mean dependent var	-4.03E-05
Sum squared resid	0.012938	Durbin-Watson stat	1.228394

The results above indicate that the real state minimum wage has no significant effect on state unemployment. Another method attempted to test different specification for the real state minimum wage by running the previous regressions with the change of the log-real minimum wage. These results were identical. To conclude this section, the results recorded in this subsection appear to be that the real minimum wage does not seem to correlate with growth or unemployment.

4.5 Long Run Estimates: ARDL Models

Because of the short run results found prior to this section, we can further the analysis to test the issue of the macroeconomic effects of the minimum wage and long run effects. The results presented thus far are to be understood as short run effects, to the extent that each variable is considered in changes and is therefore fixed. To further the analysis of the effects of the minimum wage in the long run we first incorporate the same set-up as stated prior, where the endogenous variable is alternatively the level of real State GDP or the level of unemployment rate given the following equation:

$$U_{it} = \beta_0 + \beta_1 logW_{it} + \beta_2 logY_{it} + \epsilon_{it}$$

and:

$$Y_{it} = \beta_0 + \beta_1 logW_{it} + \beta_2 U_{it} + \epsilon_{it}$$

where, again, Y is the level of State real GDP, W is the real State minimum wage, and U the level of each States' unemployment rate.

To distinguish between short run and long run effects our preferred estimation method is the Autoregressive Distributed Lag, or ARDL model, extended in a panel setting (Pesaran, Shin and Smith 1999). The ARDL method has the benefit of separating short and long run effects, as well as allowing for lagged effects of the exogenous variables. Also, by using the Hannan-Quinn information criterion to choose the number of lags required in each specification above, and allowed for a trend in the model, as our variables are trending in the sample and the trend turned out to be significant, however minimal. The results for the following can be shown in Figures 19 and 20 below.

Figure 19: Autoregressive Distributed Lag (ARDL)

Dependent Variable: DLOG(Y)
Method: ARDL
Date: 04/28/17 Time: 17:04
Sample: 2005Q2 2015Q4
Included observations: 2236
Maximum dependent lags: 8 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (8 lags, automatic): LOG(W) U
Fixed regressors: C
Number of models evalulated: 64
Selected Model: ARDL(1, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
LOG(W)	0.063675	0.011570	5.503318	0.0000
U	-1.155402	0.039106	-29.54534	0.0000
	Short Run Equation			
COINTEQ01	-0.316916	0.028671	-11.05358	0.0000
DLOG(W)	-0.012894	0.008125	-1.587007	0.1127
D(U)	-0.985191	0.160062	-6.155070	0.0000
C	3.780528	0.342944	11.02374	0.0000
@TREND	0.000660	0.000118	5.616399	0.0000
Mean dependent var	0.003053	S.D. dependent var		0.014255

S.E. of regression	0.012291	Akaike info criterion	-5.974423
Sum squared resid	0.306086	Schwarz criterion	-5.317656
Log likelihood	7096.740	Hannan-Quinn criter.	-5.734911

Figure 20: Hannan-Quinn Criterion

Dependent Variable: D(U)
Method: ARDL
Date: 05/01/17 Time: 20:55
Sample: 2005Q3 2015Q4
Included observations: 2184
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (4 lags, automatic): LOG(Y) LOG(W)
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(2, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
LOG(Y)	0.016301	0.021464	0.759485	0.4477
LOG(W)	0.168098	0.006388	26.31352	0.0000
	Short Run Equation			
COINTEQ01	-0.103907	0.012621	-8.232704	0.0000
D(U(-1))	0.667597	0.019963	33.44221	0.0000
DLOG(Y)	-0.054603	0.008461	-6.453697	0.0000
DLOG(W)	-0.011488	0.002308	-4.978026	0.0000
C	-0.046506	0.005646	-8.236594	0.0000
@TREND	-8.55E-05	1.00E-05	-8.514979	0.0000

Mean dependent var	-1.05E-05	S.D. dependent var	0.004190
S.E. of regression	0.002518	Akaike info criterion	-8.829864
Sum squared resid	0.012511	Schwarz criterion	-8.042746
Log likelihood	10415.36	Hannan-Quinn criter.	-8.542814

The first regression shown in Figure 19 indicates that the real minimum wage has a positive but small effect on GDP in the long run with an elasticity of +0.06 while GDP and unemployment are inversely correlated in the long run with an elasticity of -1.15.

The second regression shown in Figure 20 estimates the long run effects of the real minimum wage and real GDP on unemployment. The results are surprising because of two aspects. First, the level of GDP does not seem to be significantly associated with the level

of unemployment in the long run, but is associated negatively in the short run. This is difficult to interpret, especially because of the results in our previous section that unemployment lowers GDP in the long run, and significantly. The second surprising result is the positive and significant effect of the real minimum wage on the unemployment rate. This is contrary to the results found so far based off the absence of correlation. We also should remember that those results found were understood to be short run effects.

What is to be made of this positive correlation between the real minimum wage and unemployment? First, we must look at the magnitude: the (semi-) elasticity in the long run is +0.17, which indicates that a marginal $1 increase in the real minimum wage has been associated with a 0.17 increase in the unemployment rate which is indicative of an increase from 5% to 5.17% as an example. This is sizeable, however, not very large. Second, we should recall that the period under estimation is quarterly data from 2005 to 2015 which covers the very recent recession, the largest downturn since the great depression. The federal minimum wage increases during 2007 to 2009 were enacted prior to the recession. But as stated in the previous chapter, this is not to say that the minimum wage increases caused the Great Recession. With this in respect, we have a conflation of two events in the sample which includes a mandated rise of the federal minimum wage and a rise in the unemployment rate, leading to the finding of a positive association between the two, also potentially explaining the lack of explanatory power of economic growth. In this sense, the positive association is not surprising between the two. However, this positive and significant connection between the minimum wage and the unemployment rate should not so much be understood as a causal relationship as much as an unfortunate conflation of events.

4.6 Disposable Income, Employment and the Minimum Wage

The following subsection continues to address the issue of the macroeconomic effects of the minimum wage, changing the measurement of the variables as well as the sample we are considering:

Notes on Variables: Economic growth is now seen as the nominal, disposable, per capita personal income, the minimum wage is now considered nominal instead of in real terms, and we replace the unemployment rate by employment. The new variables are now called, Y_t^{DPC}, $W_{nom,t}$ and N, respectively. Noting that each variable is now considered in nominal terms (and in logs). Each variable is trending so a deterministic trend has been added to each of the specifications considered below.

Notes on Sample: Instead of focusing on a quarterly sample from 2005 to 2015, the further analysis relies on a longer sample using annual data. In this case, the data used is available for all variables on the sample annual sample of 1969 to 2015. The reason for changing the sample to an extensive period allows the analysis to hopefully provide more convincing results for the long run analysis. Previously, the analysis inferred long run relationships based on a 10-year period. Now the period covers 47 years annually.

The reason for this change in variables is simple. Much of the literature provided from the previous chapter is concerned with possible (dis)employment effects of the minimum wage with a possible central consensus of an extremely small effect is significant, as evidenced in our literature review in the previous chapter, the minimum wage is also a benefit in terms of incomes, especially for low incomes. Therefore, this project does not simply try to assess the (dis)employment costs, but also to estimate any potential benefit on incomes.

There are many questions to be asked at this stage. Are increases in the minimum wage costly in terms of employment, in the present setting? Are they beneficial in terms of disposable income? Is there a trade-off aspect? Those are the sort of questions this analysis is attempting to answer.

The macroeconomic effects we seek to estimate are encapsulated in the following three regressions:

$$logY_{it}^{DPC} = \beta_0 + \beta_1 logW_{inom,t} + \epsilon_{it}$$

and:

$$logN_{it} = \beta_0 + \beta_1 logW_{inom,t} + \epsilon_{it}$$

and also, the same two regressions adding the third variable as a control variable:

$$logY_{it}^{DPC} = \beta_0 + \beta_1 logW_{inom,t} + \beta_2 logN_{it} + \epsilon_{it}$$

and

$$logN_{it} = \beta_0 + \beta_1 logW_{inom,t} + \beta_2 logY_{it}^{DPC} + \epsilon_{it}$$

Methodologically speaking, the analysis continues to rely on the pool mean group estimator, and the autoregressive distributive-lag model (PMG/ARDL) used in the previous sections. This choice is due to the method being very popular in the literature for panel long run effects, which is not surprising because this allows for a contrast between short run and long run effects, as well as allowing for lagged effects.

Regarding the lag order, this analysis continues to rely on the Hannan-Quinn information criterion. The present set-up can be seen as an extension of the analysis in the previous sections where we were attempting to investigate the macroeconomic effects of minimum wage changes. The main difference in this section is that the sample is much

extended in time, accounting for annual state data, and that we are using different variables to measure growth and (dis)employment effects. More precisely, the present analysis seeks to answer two interrelated questions: What is the effect of changes in the minimum wage on personal disposable income, with and without controlling for (dis)employment effects (Equations 3 and 1 above). And what is the effect of changes in the minimum wage on employment, with and without controlling for disposable income (Equations 4 and 2 above). The results are the following. For the effects on personal disposable income, we get Figures 21 and 22 below.

Figure 21: ARDL for Personal Disposable Income

Dependent Variable: DLOG(YD)
Method: ARDL
Date: 05/01/17 Time: 21:48
Sample: 1970 2015
Included observations: 2346
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (4 lags, automatic): LOG(W_NOM)
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
LOG(W_NOM)	1.675958	0.117829	14.22367	0.0000
	Short Run Equation			
COINTEQ01	-0.029619	0.005636	-5.255484	0.0000
DLOG(W_NOM)	-0.007423	0.009837	-0.754562	0.4506
C	0.311358	0.041605	7.483730	0.0000
@TREND	-0.001672	3.00E-05	-55.72823	0.0000

Mean dependent var	0.055437	S.D. dependent var	0.033447
S.E. of regression	0.025350	Akaike info criterion	-4.602284
Sum squared resid	1.408626	Schwarz criterion	-4.107789
Log likelihood	5720.837	Hannan-Quinn criter.	-4.422375

and:

Figure 22: ARDL for Personal Disposable Income with Employment

Dependent Variable: DLOG(YD)
Method: ARDL
Date: 05/01/17 Time: 21:54
Sample: 1970 2015
Included observations: 2346
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (4 lags, automatic): LOG(W_NOM)
LOG(EMPLOYMENT)
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(1, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
LOG(W_NOM)	0.960114	0.046336	20.72080	0.0000
LOG(EMPLOYMENT)	1.254862	0.072355	17.34317	0.0000
	Short Run Equation			
COINTEQ01	-0.089870	0.006291	-14.28446	0.0000
DLOG(W_NOM)	-0.047093	0.008658	-5.439009	0.0000
DLOG(EMPLOYMENT)	0.527561	0.032012	16.48024	0.0000
C	-0.780103	0.054713	-14.25806	0.0000
@TREND	-0.001392	0.000143	-9.705105	0.0000

Mean dependent var	0.055437	S.D. dependent var	0.033447
S.E. of regression	0.022453	Akaike info criterion	-4.855975
Sum squared resid	1.078856	Schwarz criterion	-4.236048
Log likelihood	6076.887	Hannan-Quinn criter.	-4.630431

The effect of the nominal minimum wage on nominal personal disposable income is positive and very significant in the long run, and potentially negative, significant but very small, in the short run. In the long run, a $1 increase in the minimum wage is associated with either a $1.67 increase in disposable personal income shown in Figure 21 or a $0.96 increase seen in Figure 22. Both estimates appear to be extremely significant.

The magnitude of those coefficients is interesting. The elasticity of 0.96 indicates an almost perfect $1 for $1 correlation. However, in the first regression the positive 1.67 elasticity points to a larger effect, larger than a one-for-one. If this is correct, a possible

interpretation of this result is a multiplier effect of a higher minimum wage. It is also possible that lifting incomes at the bottom provides greater aggregate demand in the economy, or States, leading to higher expenditures, etc.

However, are there (dis)employment effects to higher minimum wages? To answer this question, the analysis then turns to the following two regressions, explaining employment levels with the minimum wage, with and without disposable personal income, on a State by State, pool mean regression basis. The results are as follows in Figures 23 and 24.

Figure 23: Employment Levels with the Minimum Wage

Dependent Variable: DLOG(EMPLOYMENT)
Method: ARDL
Date: 05/01/17 Time: 21:53
Sample: 1971 2015
Included observations: 2295
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (4 lags, automatic): LOG(W_NOM)
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(2, 2)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
LOG(W_NOM)	211.8481	11309.67	0.018732	0.9851
	Short Run Equation			
COINTEQ01	7.90E-05	1.47E-05	5.386344	0.0000
DLOG(EMPLOYMENT(-1))	0.406187	0.014990	27.09687	0.0000
DLOG(W_NOM)	-0.012323	0.007447	-1.654923	0.0981
DLOG(W_NOM(-1))	-0.086709	0.008913	-9.727868	0.0000
C	0.030178	0.002063	14.62760	0.0000
@TREND	0.000250	0.000106	2.369477	0.0179

Mean dependent var	0.016990	S.D. dependent var	0.020796
S.E. of regression	0.015119	Akaike info criterion	-5.231851
Sum squared resid	0.477719	Schwarz criterion	-4.491314
Log likelihood	6577.373	Hannan-Quinn criter.	-4.962426

and:

Figure 24: Employment Levels with the Minimum Wage and Disposable Income

Dependent Variable: DLOG(EMPLOYMENT)
Method: ARDL
Date: 05/01/17 Time: 21:56
Sample: 1971 2015
Included observations: 2295
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Hannan-Quinn criterion (HQ)
Dynamic regressors (4 lags, automatic): LOG(YD) LOG(W_NOM)
Fixed regressors: C
Number of models evalulated: 16
Selected Model: ARDL(2, 1, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
LOG(YD)	0.375168	0.013914	26.96297	0.0000
LOG(W_NOM)	-0.358598	0.021321	-16.81922	0.0000
	Short Run Equation			
COINTEQ01	-0.178079	0.011488	-15.50167	0.0000
DLOG(EMPLOYMENT(-1))	0.366613	0.014423	25.41819	0.0000
DLOG(YD)	0.242620	0.018177	13.34749	0.0000
DLOG(W_NOM)	0.021768	0.004963	4.386230	0.0000
C	1.974358	0.135915	14.52637	0.0000
@TREND	0.001751	0.000186	9.401867	0.0000

Mean dependent var	0.016990	S.D. dependent var	0.020796
S.E. of regression	0.013265	Akaike info criterion	-5.444761
Sum squared resid	0.367596	Schwarz criterion	-4.701813
Log likelihood	6833.546	Hannan-Quinn criter.	-5.174459

The first set of results, without a disposable income as a control variable, indicate that there is no significant long run effect of the minimum wage on employment, but also that there is a negative short run employment effects. The (dis)employment effect is captured by a short run elasticity of employment to the minimum wage of -0.01 plus -0.09 equating to –0.10 elasticity. The estimated (dis)employment effect observed is consistent with the literature which typically centers on a short run (dis)employment effect of –0.03. Therefore, the estimate here is larger, but not out-of-bounds, compared to the literature.

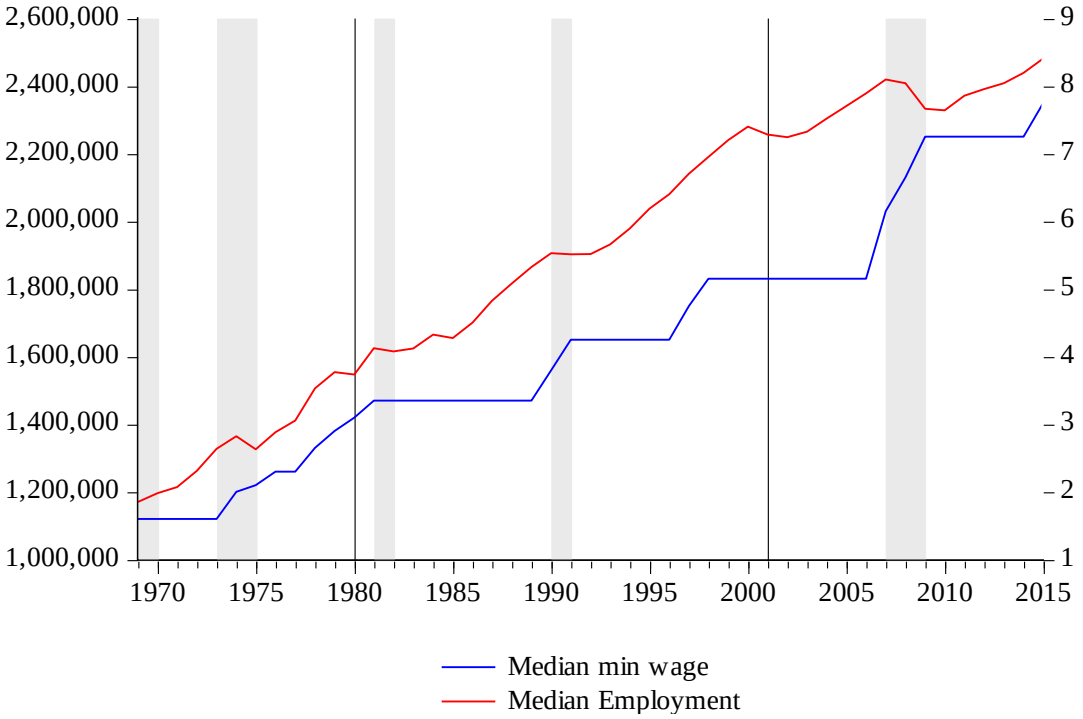
The second set of results, with a disposable income control variable, comes in direct contradiction with those results. In this regression, the short run effect is significant but positive and small +0.02 while the long run effect is significant and negative, with an elasticity of –0.36, where we previously found insignificance. This is reminiscent of the findings in the previous section where we had found a positive correlation between the real minimum wage and the unemployment rate, but we ushered to say that this might be caused due to the choice of the sample.

Nevertheless, the analysis investigated this (dis)employment effect further through changing the lag structure of the model and considered the Akaike and Schwartz information criterion, instead of the more mainstream Hannan-Quinn criterion. The long run (dis)employment effects were robust to those alternative choices.

The analysis investigated this (dis)employment effect even further. The reason being for this further investigation is that the analysis is working at the macroeconomic level, and at the macroeconomic level we note that the nominal minimum wage has been increasing over time while employment has also increased over time, in which both have been growing during the long run. Why should there be a negative correlation between the two, as previously found?

The point made that both the nominal minimum wage and employment have generally trended upwards can be captured by the following figure, Figure 25, below plotting the medians wages across States of both variables.

Figure 25: Annual Median Wage and Median Employment



The figure above clearly indicates a positive relationship between the nominal minimum wage, as enacted by the States, and the level of employment.

4.7 Alternative Estimation Method: Cointegration

The previous section presented a challenge in terms of the interpretation of (some of) the results, particularly the important question of the (dis)employment effect of the minimum wage in the long run.

To investigate this correlation further the analysis now resorts to another estimation method, this time using the theory of panel cointegration using Dynamic OLS (DOLS). For the sake of completeness, as well as to provide robustness checks, the analysis left the regression specification, variables and sample identical to the ones considered so far; the only thing that changes is the estimation method which is switched from PMG/ARDL to

DOLS. The following now returns to the original regression specifications, as captured by the four regressions stated in the previous section captured below for convenience:

$$logY_{it}^{DPC} = \beta_0 + \beta_1 logW_{inom,t} + \epsilon_{it}$$

and:

$$logN_{it} = \beta_0 + \beta_1 logW_{inom,t} + \epsilon_{it}$$

and the same two regressions adding the third variable as a control variable:

$$logY_{it}^{DPC} = \beta_0 + \beta_1 logW_{inom,t} + \beta_2 logN_{it} + \epsilon_{it}$$

and:

$$logN_{it} = \beta_0 + \beta_1 logW_{inom,t} + \beta_2 logY_{it}^{DPC} + \epsilon_{it}$$

In each specification, we used the Dynamic OLS estimator, choosing to include a trend in the model as the data is clearly nonstationary and trending over time. The lead/lag length was chosen using the Hannan-Quinn information criterion again. The results are shown in Figures 26 and 27 for the growth equations 3 and 1 using disposable personal income

Figure 26: Dynamic OLS for Nominal Wages

Dependent Variable: LOG(YD)
Method: Panel Dynamic Least Squares (DOLS)
Date: 05/01/17 Time: 23:40
Sample (adjusted): 1970 2015
Periods included: 46
Cross-sections included: 51
Total panel (unbalanced) observations: 2277
Panel method: Weighted estimation
Cointegrating equation deterministics: C @TREND
Automatic leads and lags specification (based on HQC criterion, max=*)
Long-run variance weights (Prewhitening with lags = -1 from HQ maxlags = -1, Bartlett kernel, Newey-West automatic bandwidth, NW automatic lag length)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W_NOM)	0.945781	0.070470	13.42102	0.0000

R-squared	0.980471	Mean dependent var	9.689009
Adjusted R-squared	0.978360	S.D. dependent var	0.709586
S.E. of regression	0.104383	Sum squared resid	22.38007
Long-run variance	0.175410		

and

Figure 27: Dynamic OLS for Nominal Wages and Employment

Dependent Variable: LOG(YD)
Method: Panel Dynamic Least Squares (DOLS)
Date: 05/01/17 Time: 23:42
Sample (adjusted): 1970 2015
Periods included: 46
Cross-sections included: 51
Total panel (unbalanced) observations: 2291
Panel method: Weighted estimation
Cointegrating equation deterministics: C @TREND
Automatic leads and lags specification (based on HQC criterion, max=*)
Long-run variance weights (Prewhitening with lags = -1 from HQ maxlags = -1, Bartlett kernel, Newey-West automatic bandwidth, NW automatic lag length)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W_NOM)	0.627163	0.041264	15.19889	0.0000
LOG(EMPLOYMENT)	1.441556	0.060779	23.71791	0.0000

R-squared	0.989708	Mean dependent var	9.685248
Adjusted R-squared	0.988067	S.D. dependent var	0.715132
S.E. of regression	0.078120	Sum squared resid	12.05288
Long-run variance	0.061122		

This set of results above confirms the results presented in the previous section stating that there is indeed a long run cointegrating relationship between the nominal minimum wage and disposable personal income, with the income elasticity this time between +0.62 and +0.94.

The further analysis then turns now to the more important subject matter of debate of the (dis)employment effect, the results for equations 4 and 2 are depicted in Figures 28 and 29.

Figure 28: Dynamic OLS for Employment with Nominal Wages

Dependent Variable: LOG(EMPLOYMENT)
Method: Panel Dynamic Least Squares (DOLS)

Date: 05/01/17 Time: 23:45
Sample (adjusted): 1970 2015
Periods included: 46
Cross-sections included: 51
Total panel (unbalanced) observations: 2315
Panel method: Weighted estimation
Cointegrating equation deterministics: C @TREND
Automatic leads and lags specification (based on HQC criterion, max=*)
Long-run variance weights (Prewhitening with lags = -1 from HQ maxlags = -1, Bartlett kernel, Newey-West automatic bandwidth, NW automatic lag length)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W_NOM)	0.104853	0.024010	4.367051	0.0000

R-squared	0.997472	Mean dependent var	14.34193
Adjusted R-squared	0.997254	S.D. dependent var	1.011380
S.E. of regression	0.052997	Sum squared resid	5.982553
Long-run variance	0.055452		

Figure 29: Dynamic OLS for Employment with Nominal Wages and Disposable Income

Dependent Variable: LOG(EMPLOYMENT)
Method: Panel Dynamic Least Squares (DOLS)
Date: 05/01/17 Time: 23:48
Sample (adjusted): 1970 2015
Periods included: 46
Cross-sections included: 51
Total panel (unbalanced) observations: 2322
Panel method: Weighted estimation
Cointegrating equation deterministics: C @TREND
Automatic leads and lags specification (based on HQC criterion, max=*)
Long-run variance weights (Prewhitening with lags = -1 from HQ maxlags = -1, Bartlett kernel, Newey-West automatic bandwidth, NW automatic lag length)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(W_NOM)	-0.201605	0.019155	-10.52520	0.0000
LOG(YD)	0.330772	0.012864	25.71280	0.0000

R-squared	0.998706	Mean dependent var	14.34700
Adjusted R-squared	0.998547	S.D. dependent var	1.009212
S.E. of regression	0.038465	Sum squared resid	3.059712
Long-run variance	0.024664		

Overall, the results in this section support the results shown in the previous section. Notably so, the present results using Dynamic OLS (DOLS) indicate that there is a *positive* relationship between the minimum wage and employment with an elasticity of +0.10 in the

first result, but that this relationship becomes negative when disposable income is accounted for with an elasticity of –0.20 in the second figure above.

V. Concluding Remarks

The previous chapter attempts to quantify of the macroeconomic effects of minimum wage increases. To do so, we tried various estimation methods, covering short run as well as long run estimates, various samples, quarterly 2005—2014 and annual 1969—2015, various variable definitions and considered the variables in nominal or real terms. The advantage of using such a degree of variation in methods, samples and measurements is that such variety provides robustness to our findings, a finding that is consistent across methods, samples and measurements is here considered "robust". The disadvantage of such approach is that it is likely that different methods, measurements and samples will lead to different results. However, this case of diverging results does not seem to be happening here. Using the methods, samples and measurements explained infra, we find consistent results. The analysis summarized by assessing the following points. The minimum wage seems to have a very small, negative and possibly significant effect on employment in the short run. There are still questions to be asked on the (dis)employment effects in the long run. the results indicate increased employment when incomes are not present in the model, and (dis)employment when they are present. In any case, minimum wages appear to raise incomes in both the short and long run, with possible one-for-one effects or even a multiplier effect. This last point should be particularly accepted in mind when possible (dis)employment effects are present.

From the literature provided earlier in this project, the microeconomic analysis on minimum wages favors rising wages and employment levels individual state wages. Most of the recent literature aims in favor towards rising local city or sub-state wages that seem to have little significance on employment factors given the area of study. While the federal

wage is still used today for some states, a majority of the others have enacted higher minimum wages than the federal last raised in 2009. Micro-managing minimum wages separate from the federal tends to be the norm and one of the most talked about issues in recent debates. Given various area factors that coincide with the wage floor, in many cases, this gives local legislation the upper hand in terms of acting on a serious issue. It is faster and more efficient for localities to adjust their minimum wages instead of waiting around in hopes of a federal wage which may never come any time soon.

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Appendix A. Notes on the Tables

Table 1 is strictly a time series that shows exactly when Federal wage laws in the United States have been increased in the United States. This table specifically comes from the Congressional Research Service (CRS) which is a component of the Library of Congress. The CRS is generally used by policy members as a means of education in the legislative process. Tables 2 and 3 come specifically from individual studies regarding wages.Table 2 comes from a study done by Brown, Gilroy, and Kohen (1982) analyzing the estimated impact of a 10% increase of a wage increase on teenage employment. Table 3 is provided from the National Employment Law Project April 2016 fact sheet analyzing sub-state/city minimum wages higher than the state and federal minimum wage. The National Employment Law Project's fact sheet is provided to shed light on minimum wage research and developments. Table 3 provides five different conclusions on studies done where cities have individual minimum wage laws. It includes the name of the study, the year the study was published, where the study was done, and a summary of findings.

Appendix B. Notes on the Figures

The first two figures come directly from the data library of the Economic Policy Institute, both data sets were updated in February of 2017 automatically adjusting for 2016 dollar amounts accounting for wage and salary workers between the ages of 18 and 64. Further notes for wages by education level can be found below.

Less than high school: No high school diploma or equivalent.
High school: Earned a high school diploma or equivalent, such as the General Education Development (GED) credential.
Some college: Earned a high school diploma or equivalent and completed one or more postsecondary courses but earned less than a four-year bachelor's degree.
Bachelor's degree: Earned a bachelor's degree.
Advanced degree: Earned a master's, doctoral, or professional degree.

The following two figures come from Brown, Gilroy, and Kohen (1982) explaining two key labor market models for minimum wages. Figures 5 through 8 involved using the same data process to come up with unique values for 2015 adjusted dollars using three different inflation levels. The first being the CPI (Consumer Price Index) derived from the Bureau of Labor Statistics generating rebased CPI monthly values equaling 1 in December of 2015. The corresponding monthly nominal wage is divided by the CPI rebased value to get the CPI real wage. This process was repeated for the CPI-U-RS (CPI Reasearch Series Using Current Methods) and the GDP Deflator. The CPI-U-RS data is only available from 1978 and on because that is when the CPI-U-RS began. The GDP Deflator data comes from the Bureau of Economic Analysis and is only available quarterly. Figure 9 comes from Doucouliagos and Stanley (2009) showing a basic funnel chart of minimum wage and employment effects from various studies generating a meta-regression analysis. Figure 10 shows states who have a greater nominal minimum wage than the national level at the last quarter of 2015 provided from Zipperer's data set.

Appendix C. Notes on Contribution

All of the nominal minimum wage data comes from Zipperer (2016), adjusted real wages were used from this data set using the GDP Deflator adjusted for 2015 dollar amounts. State unemployment rates were acquired from the Bureau of Labor Statistics and state GDP levels (both quarterly and annual) and state disposable incomes (annual) were acquired from the Bureau of Economic Analysis. Employment data (annual) was acquired from the Bureau of Labor Statistics.